

Beginner's Issue



Mario, IK1HXN and Gilberto, IK1HSR, display equipment used in 1992 CQ/RJ WW RTTY Contest. (See page 22 for story)

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USA/Canada/Mexico . . . \$16.00
1st Class \$19.00
Foreign . Surf. \$24.00/AIR \$32.00

Exceptions: All former USSR countries, Asia, Australia, New Zealand, Pacific Islands, Africa (other than North Africa), Indian Ocean Islands, and Middle East - AIR ONLY. (Surface mail not advised these areas) Cash, Check or money order, in U.S. funds drawn on U.S. banks only with request. No credit cards accepted.

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POSTMASTER:

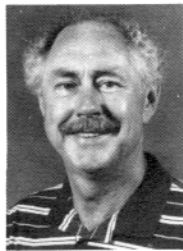
The *RTTY DIGITAL JOURNAL* (USPS 391850) is published ten times per year except bi-monthly May/June and July/August issues, for \$16.00 per year, by the *RTTY DIGITAL JOURNAL*, 1904 Carolton Lane, Fallbrook, CA 92028. Second Class postage paid at Fallbrook, CA 92028 and additional mailing offices.

POSTMASTER:

Please send all address changes to: *RTTY DIGITAL JOURNAL*, 1904 Carolton Lane, Fallbrook, CA 92028-4614

ISSN 1067-3873

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HITS & MISSES

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Where To Begin?

This issue is dedicated to those subscribers who are new to the digital modes. I asked each of the columnists a few months back to prepare for this issue. I think they have done an outstanding job. There may be some redundancy here and there but by-in-large the information contained in each column this month is a bit different. So, if you are a beginner to the digital modes, I strongly suggest you read each columnist's material. In a couple of cases the columnist started last month because they wanted to give you more in depth direction. Even if you are not new to the digital modes, you may find some of the material in this issue of use. In particular, Jim Mortensen, N2HOS, has spent a great deal of space outlining procedures for setting up a PC.

I think everyone can learn something from this issue. Maybe you have always been active on RTTY but have not tried AMTOR or Packet. This issue will help you get started. Once you take the challenge to try a new mode, you will usually find an Elmer on the air who will help you over the rough spots. Take the plunge, try something different, you'll be happy you did.

Digital Committee

Recently the ARRL BOD met in Florida to take care of League business. On the agenda was the recommendations of the Digital Committee. After considerable deliberation, the BOD directed the League to draw up a petition regarding the DC recommendations. The BOD made some changes in the DC recommendations that they felt would cause some problems when submitted to the FCC. One of the changes made will nullify semi-automatic from the recommendations. Apparently the BOD felt that semi-automatic operation would cause too much interference in the keyboard segments of the bands. However, in the case of APLink, it has been my experience that a minimal amount of interference has happened in the past.

The BOD has also instructed the DC to continue to pursue semi-automatic with the intent of implementing this method into main stream operations while protecting amateurs using other modes and operating interests.

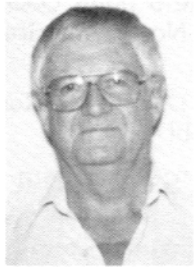
As a member of the DC, I consider semi-automatic operation a part of our everyday operations and I feel badly that it was not adopted by the BOD. Certainly, I for one, will continue to strive for semi-automatic acceptance as soon as possible.

At present, if all APLink stations were to change over to fully automatic and move into the new band segments suggested, surely chaos will be the result and traffic handling as we know it will either halt or slow down considerably. Hopefully, a solution can be found quickly to this impasse.

DAYTON UPDATE

The block of rooms assigned to me for our RTTY gang are all filled. So if you still plan to make Dayton this year, I suggest you secure a room ASAP. Rooms are always at a premium each year but the Radisson Hotel was nice to us this year and gave us a large number of rooms. This large block of rooms has made it possible for more of our group to stay together at the same hotel. We have the good folks at the Radisson to thank for this arrangement.

If you are also going to attend the RTTY dinner this year, be sure to send your money to Steve Waterman, K4CJX, as soon as possible. The hotel needs to know how many will attend far in advance of our arrival. We would not want to show up with a really large group and find the hotel without a room large enough to accommodate us. So please, don't hold back, SEND in your money for the dinner today. If you attended last year, then you already know how good the food is at the hotel. They do an outstanding job for us each year. The dinner price includes everything, tip, tax, etc. and I have never received a complaint about the food at one of our dinners. (cont' on page 10)



CONTESTING

Richard Lawton, N6GG
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Pioneer, CA 95666

RTTY Contests - Coming Events

All rules + logsheets are in the RTTY Contester's Guide

Date:	Contest:
MAR 20-22	BARTG WW RTTY Contest (England)
APR 17-18	SARTG WW Amtor Contest (Sweden)
MAY 8-9	VOLTA RTTY WW Contest (Italy)
JUN 12-13	ANARTS WW RTTY Contest (Australia)
AUG 21-22	SARTG WW RTTY Contest (Sweden)
SEP 25-26	CQ/RTTY Journal RTTY Contest (USA)

REMINDERS

CORRECTION: EA RTTY Contest rules in last month's column incorrectly stated that QSO's with your own country would not be valid. It should read: "QSO's with your own country will count as a multiplier, but will have ZERO POINT value". So, I was half right, and partially wrong. I half-way apologize.

Mail EA RTTY Contest logs to:
EA WW RTTY CONTEST Manager
Antonio Alcolado, EA1MV
P.O.Box 240
09400 Aranda De Duero (Burgos)
SPAIN

COMING UP

March 20-22 BARTG WW RTTY Contest

Sponsored by British Amateur Radio Teleprinter Group.

Starts at 0200Z Saturday, and ends at 0200Z Monday, a total of 48 hours. Single operator and SWL stations are permitted only 30 hours of operation. Multi-operator stations may operate the full 48 hours. Time off periods may be taken at any time but must be not less than 3 hours per period. Times off operation must be shown on contest summary sheet.

Bands: All five bands; 10 through 80M.

Classes: 1) Single op, all band; 2) Single op, single band; 3) Multi-op, all band; 4) SWL.

Exchange: RST + QSO number + time in UTC

Multipliers: All DXCC countries (including W, VE and VK) AND all call areas in W, VE, and VK count as multipliers on each band. The same multiplier counts again on a new band.

Scoring: Each QSO counts as one point. For scoring purposes, continents will be counted only once, regardless of the band worked. Max. of six continents. Final score = QSO points x multipliers x continents (max 6).

Logs: Use separate logsheets for each band. Logs must show: BAND, DATE and TIME (UTC), CALLSIGN, MESSAGE Sent and Received, COUNTRIES and POINTS claimed. Summary sheet must show: full scoring, times of operation, and address for correspondence. Logsheets, summary sheets and multiplier and dupesheets are all available for copying from the RTTY Contester's Guide, published by RTTY Journal. Logs must be received by May 25 to qualify.

Send logs to:

BARTG c/o John Barber, G4SKA
32 Wellbrook Street
Tiverton, Devon
EX16 5JW, ENGLAND

Comments: This is a 48 hour contest, but only 30 hours operating time allowed for single ops. The time off periods must be 3 hours minimum length and listed in the summary sheet. This contest gets great activity from all over the world. Try to plan your off times to be during the least

productive time of day, such as when propagation does not favor your area. The fact that W/VE/VK call areas count as separate countries on each band means that CQing should be the most productive way to make a good score for the W/VE/VK ops. Also, band multipliers helps to alleviate the QRM on the high bands, by spreading out the CQers to other bands. Finally, don't forget the WAC bonus of six multipliers.

April 17-18 SARTG WW AMTOR Contest

Sponsored by the Scandinavian Amateur Radio Teleprinter Group.

Contest periods are: 0000-0800Z Saturday, 1600-2400Z Saturday, and 0800-1600Z Sunday.

Bands: All five bands, 10 through 80M.

Classes: A: Single op, all band; B: Single op, single band; C: Multi op, single transmitter, all band; D: SWL, all band.

Exchange: RST + Name + QSO number (starting with 001).

Mode: Only AMTOR allowed. Use FEC (mode B) for calling. Use ARQ (mode A) for exchange of contest messages. Exchanging of contest messages in FEC or in any way other than ARQ is subject to disqualification.

Multipliers: Each DXCC country counts as one multiplier on each band, including the first QSO with Australia, Canada, Japan, and USA. Each call district in Australia, Canada, Japan, and USA will also count as one additional multiplier on each band.

QSO Points: QSO with own country; five points. QSO with other stations in own continent; ten points. QSO with other continents; fifteen points.

Scoring: Sum of QSO points x sum of multipliers = TOTAL SCORE.

Awards: To the top stations in each class, country and district, if the number of QSO's is reasonable.

Logs: Use separate logsheets for each band. Logs must show: BAND, DATE and TIME (UTC), CALLSIGN, MESSAGE Sent and Received, MULTIPLIERS and QSO POINTS. Summary sheet must show full scoring, class, YOUR CALL, NAME, and ADDRESS, and a signed declaration that all contest rules and regulations for your own license have been observed. For multi-op stations, all calls

or names of all operators should be listed. Logs must be received by June 10, 1993.

Mail logs to:

SARTG Contest Manager
Bo Ohlsson, SM4CMG
Skulsta 1258
S-710 41 Fellingsbro
SWEDEN

Comments: This is a strictly AMTOR contest. The first and only AMTOR contest around. Note that there are three operating periods, each eight hours long. In between are two eight hour rest periods. Pileups must all be in FEC mode, which is always interesting. After contact is established, each station must switch over to ARQ (mode A) for the exchange.

Hint of the Month

Receiving Antennas for RTTY Contesting

One of the unique experiences in RTTY, especially RTTY contesting, is trying to read a reasonably strong signal that simply can't be read. Here is a pileup of stations, working someone that you cannot read. How come? Why do others have no problem, work the station and leave, and you still don't know who this station is? (First be sure the data is not inverted.)

Well, from the School of Hard Knocks I have found a procedure for deciphering this kind of cruel treatment. Namely, try switching to a different antenna for receiving. Any antenna. The reason is; that old monster, "MULTIPATH", is playing tricks on you.

HF digital modes are much more sensitive to multipath than CW or SSB. What happens is that when two or more paths of the same signal arrive some microseconds apart, the 5-bit code for each character can get clobbered. A partial cure is to actually change the path of the received signal by using an antenna with a different lobe pattern. Even though the signal might be weaker, the bottom line is READABILITY. With antennas designed for receiving, a good portion of multipath problems can be wiped out.

Those with rotary beam antennas can try turning the beam away from the strongest "S" meter reading, to as much as 30 degrees off. Depending on the time of day and the band, turn it either towards the greyline or the

daylight side of the greyline. (Greyline is the dawn/dusk line that constantly moves around the earth.) This changes the gain of the paths to, perhaps, select the better of the bunch. It's worth a try - especially when you are desperate!

I have done some work on receiving antennas, including some tricks to assure that your transmitting signal doesn't get into your receiver front end. This subject has much potential for the HF digital world. I intend to cover receiving antennas in a future column. The ultimate answer, though, is polarization or space diversity antennas with dual diversity receivers, along with an automated means of selection at the receivers' IF output. This has been proven to increase data thruput on commercial HF RTTY data links.

More on the 1992 CQ WW RTTY Contest...now from P40RY

Received a great letter from Don Hill, AA5AU who, with a team of first-class RTTY operators, established a new world record for multi-operator, single transmitter class at P40RY. Here's their results:

BAND	QSOs	QSO PTS	ST/PR	DX	ZN
80	25	75	18	2	3
40	319	933	49	35	18
20	533	1592	52	64	25
15	749	2235	53	69	25
10	596	1780	51	50	21

Total s: 2222 6635 x (223 + 2 20 + 92)

= 3,549,725 pts

Operators: AA5AU Don,
W6/G0AZT Eddie, KP2N Ron, and
N0FMR Frank.

The Aruba QTH belongs to Carl Cook, AI6V. Carl chose this spot a number of years ago to build up a super contest station. Numerous SSB and CW contest world records have been made at this spot. There are 3 towers for beam antennas. Aruba is a small island off the coast of Venezuela.

Comparing the above with W3LPL's results published in the December issue is very interesting. As Don points out, W3LPL had only 11 more QSO's and had more multipliers in every category, and yet P40RY won by over 400,000 points. The big difference was in QSO points, caused by the point differential between North and South America. Stations in South

America have more 3 point QSO's available than do North American stations.

Congratulations to Don, Eddie, Ron, and Frank! Great job!

NEWCOMER'S CORNER

Setting the RF and Audio Controls On Your Transceiver

Setting the RF gain control on an RTTY signal is much like setting it for an AM signal. As in AM, a steady carrier is in place. But unlike AM, static crashes can cause a big loss in data. If there is little static, such as the usual conditions on 10 Meters, full RF gain is good because, as the signal fades in and out, the AGC of the receiver will tend to give a more constant input to your data demodulator.

But on the low bands, static crashes are a way of life. The loud crashes will pump your AGC (which should always be set to "FAST"). AGC pumping will quickly change the audio level to your data demodulator which can cause it to miss data, simply because the AGC dropped the output to a too low threshold to detect. With static crashes, you'll end up losing more data with too high an RF gain setting, than you would at a lower setting, because the crash itself is a lot faster than the time constant of the AGC bus.

Best settings for RF and AF controls on the low bands can be determined by watching the "S" meter and the threshold control indicator on the data demodulator. Set the RF gain control so that very few static crashes will kick the meter. Then set the AF (volume) control so that the demodulator threshold indicator barely lights on the residual background noise. That should give you the best signal-to-noise ratio for static conditions.

((73)) for now...

See you in the pileups,

de Rich, N6GG ■

P.S.

*Drop me a line with an idea to share,
Or, drop me a line with an item to air.
Drop me a line with anger to bare...
But don't drop ME...
'cause I care!*



SOFTWARE

Jim Mortensen, N2HOS

P.O. BOX 328

Indian Rocks Beach, FL 34635

'WE ARE ALL BEGINNERS'

Part Two

We begin anew with, if you followed carefully last month, a revised C and a brand new D drive set up via the FDISK partition commands. No pain _ and so far no gain at least in terms of disk capacity. The payoff arrives via data compression, the squeezing of your programs and data files into smaller segments on your hard drive. While it sounds like magic, the process gained wide acceptance last year and will be a standard ingredient soon.

Data compression values are significant. Whether you are laboring under the handicap of a 20 meg hard disk when you need 40 megs, or whether you need to increase the capacity of a VLD (very large disk), the problems are identical. There is such a need that DOS 6.0 (the next version of the venerable operating system due in 1993) reportedly contains compression as a standard feature. Be that as it may, the subject receives mostly frowns from the godfathers of the PC world. Comments range from an outright "Don't do it," to "Be Very careful." A few admit to the use of compression for graphics or archives but none are convinced of its merits, even though they acknowledge that both their backup software and their high speed modem use data compression all of the time! They suggest that a larger drive, perhaps in the 300 meg range, is a better solution! And it is _ if you have the requisite cash.

Assuming for the moment that software is a better solution as far as your treasury is concerned, defer buying additional hardware for now. Use data compression, but let me remind you once more of the two basic rules.

First, do not compress DOS, Windows, Norton Desktop for Windows, TSR's (terminate and stay resident pop-up programs) or any other software that remains in memory. Trouble is an inch away if you ignore this bit of hard-earned wisdom. This means that if your drive is a 40 meg monster from yesteryear, squeeze DOS and Win3.1, etc., into a 15-20 meg C drive, then compress the balance on D. With luck the right combination delivers the equivalent of a 60 meg drive. If you need more, the hardware route may be the only answer. Try compression. It may work, but also be realistic. Do not strive for the unreachable _ two drives and Windows on a compressed 20 meg disk!

Second, once DOS, Win3.1, TSR's, the compression program and your everyday software are loaded on C drive, and before you even think about doing anything else, make a boot disk for your computer. The potential loss of data, all of your data, is a real threat unless this disk is available. And it must be a boot disk that is fully compatible with the compression software in use. Otherwise your data can sit on the disk but be locked up and out of reach.

In this case, I am using SuperStore/Pro. But any compression product will function well as the vehicle for executing this two-drive strategy. With SSTOR, the boot disk is created by following the rules _ E X A C T L Y _ on pages 28-30 in the manual. If you are using any other version of SuperStore or any other compression program be certain that you have the correct disk in hand before proceeding. Label the disk and put it next to your heart until all of the remaining operations are completed.

BEGIN HERE

Our strategy requires a two step procedure. In order to reach the objective of a compressed drive D, we must first install the software on drive C. The boot disk or C drive is the boss and must be in control of both the process that compresses the other drive as well as the new drive itself. D is of no more value than a blank floppy disk without big brother. Installing the software demands a bit of preparation but it sounds worse than the reality. Do take all of the precautions outlined here and in the manual.

Start by going to the DOS directory and at the prompt type CHKDSK C: /F. There should be no errors on your disk at this point so CHKDSK will come back with a report on the free space available. (If errors are reported type Y until all are corrected, then delete the CHK files with a DEL *.CHK). The most critical element now is space availability. There must be at least two megs for SSTOR installation in addition to your other needs. If less, delete some records or move them to floppies for subsequent transfer to the D drive.

Moving right along _ backup your drive now. If you don't have a complete backup of C, don't proceed without it. Please! And, as soon as you do that, take the next step. Make a bootable floppy. It will take no more than two minutes and may be your only lifeboat later on. Insert a disk and type FORMAT A: /S. Label the floppy and put it in a conspicuous place! We will need it again soon.

Next, go to your DOS editor and examine your Autoexec.bat and Config.sys files. If you use 386 MAX, QEMM or EMM386, place a REM in front of the line that activates one of those or any other memory resident program. Set them aside while we install the compression software. Save both files after editing and reboot the computer. And, at that point and not a moment before, put a copy of SuperStore/Pro in A and type A:\Install. Wait a minute! Do this only at the DOS prompt and not from the Program Manager in Windows. Follow the few screen prompts and you will soon be notified that the program has been successfully installed. Reboot your computer.

At this point it is safe to reconstruct your Autoexec.bat and Config.sys files by removing the REM comments (remember nothing happens until you reboot). And, then, make a new bootable disk! Because the file structure of drive D will be modified and bear little or no resemblance to a DOS disk, this step must be taken to insure access to the compressed drive. Follow the steps on pages 28-30 in the SuperStor manual. We will skip the details here, but understand that the bootable floppy needs eight files added to its inventory. These include the Autoexec.bat and Config.sys files as well as several files from the DOS and ADDSTOR directories. It ends with the editing of the Config.sys file. The directions are specific and detailed so follow them closely. Any other version of SuperStor will have similar instructions, as will other brands.

WHEW!

The hard work is over. Finishing this project is as simple as clicking the mouse a few times. But let's tarry a moment and reflect on what it is we are trying to line up here. We want drive C to contain DOS, Windows, TSR's and as many of our heavily used programs as possible. Keep in mind, however, that you must provide Windows with room for a SWAP file on drive C as well. Go now to the Windows control panel and click 386 Enhanced, then Virtual Memory, then Change. Type in the amount you wish to allocate and back your way out of the procedure by clicking the Okay button. How big should the SWAP file be? In an ideal world, for normal use, it should be about 7 megs or more. If pressed to the wall, cut it down, all the way to 2 megs if necessary. But there is a price to pay. Smaller means slower, so be reasonable.

You need some working space as well. I would feel uncomfortable if there was less than 5 megs left after the SWAP file transaction. New data files require added space, but the big need is for flexibility. You will frequently move files or programs onto drive C before they are transferred to and compressed on D. Too much constraint here could be a problem.

Okay, on to the last step, the leap to compression. Go to the DOS prompt

and get to the SSTOR directory. Type SSTOR to launch the program. Select Preview from the menu and type D when asked to choose a drive. The display estimates the impact compression delivers on the drive. You like the numbers, so go ahead and type Prepare. At the prompt type Convert Dos Fixed Disk, then D when asked which fixed disk. Please don't make a mistake here! The prompt asks you to make sure. Say Y and then Standard for the compression ratio. As it grinds away, the screen keeps you informed about its progress as it checks the disk, defragments and then compresses. Not much time passes before it is all over. If you wish a password protection scheme can be enabled. Whatever your choice, the process is over. All you need do now is reboot, then admire your new disk capacity.

Predicting the rate of compression is difficult. The rate of compression varies widely and might run from 8:1 on graphic files to slightly over 1:1 on .EXE files. The more graphics, the better!

WHAT NOW?.

In a word, nothing. You have 1) divided your mountain of DOS data into two piles and 2) compressed one of them. Getting to the compressed portion is almost as easy as getting to a file on the C or boot drive. Type D at the DOS prompt to get to the compressed pile. It is that simple _ but recognize that the new address must be given to all those folks that need it. It's just like filling out a change-of-address form when you move from New York to Florida and a new zip code. For example, the batch file I use to launch my old DOS word processor needs but one letter changed. When it gets down to the location, it now reads D, and it works even though the batch file is in the root directory on the C drive. There are no orphans, so get to work and enjoy the extra room. Good luck.

Incidentally, there is another fine feature included in SSTOR. Floppies also qualify as a "Mountable Disk." Thus, 2 megs of data can be packed onto any 2HD floppy, great news for the backup routine. But the important aspect here is the ability of any other computer to read the data with-

out special software. A major contribution, UDE (universal data exchange) is a major plus _ and may be worth the price of the software all by itself.

LETTERS

Santa Claus found N6HM. Howard needed software to give him the full control over his rig promised by the technology, found it and writes, " _ it operates my Yaesu FT-990 from the computer. The program is called PROCAT and is shareware. He designed it to work on many ham HF radios, including mine. I had a little trouble tailoring it to my requirements until my son came home from school for the holidays. He fixed up the software for me and it works very well." While Howard complains a bit about the documentation, there is not a negative comment about his son/consultant who got it up and running! Good news and it sounds like this program has potential. Get it from Donald Rasmussen, WB8YQJ/6, 2316 214 Paso De Laura, Oceanside, CA 92056. With a Scandinavian name like that the software can't be too bad! Please let us hear about your experiments with other models and brands. This could be an important addition to our arsenal. Thanks, Howard.

Dewey W8GE voiced a common complaint after he upgraded to a new and powerful 386 machine and the Hal PCI-3000. In the good old days, he could switch from Radio-1 to Radio-2 and either work RTTY or look at the DX Cluster. Ah, but now he must multi-task and do both at the same time. The question, of course, is how to go about doing it in the best possible way. While there is no single solution to the problem, let me quote from my response to his letter.

The first option, keep it simple and don't multi-task. Quit the Hal board and switch to Packratt II without a hitch. And if that doesn't work, you have a comport problem and need to reconfigure Packratt to the right port at the right baud rate. The PCI-3000 uses neither com1 or com2, nor any IRQ that conflicts with these standard serial ports, by the way.

Secondly, multi-task, and do it via Desqview 386/v2.4. This (\$129 at PC Connection) product is a superb interface and will allow you to switch

from one mode to another at a key-stroke. Stay linked to the DX Cluster in one window and work all the DX in the other on RTTY or Amtor. Simple and elegant, DV is the multi-tasking program of choice for many among the DOS crowd.

Or, switch to Windows 3.1. Maybe it is already on your disk. Multi-tasking is easy and this is the platform of the future, at least the foreseeable future. Both the Hal software and Packratt II need to be set up in a PIF file but nothing could be easier.

Which ever approach is chosen, multi-tasking is a way of life and can

be accomplished by anyone with the desire to exploit that new computer. So, have at it. Both platforms were covered in depth in earlier RTTY Journal columns. If you don't have the issues or weren't then a subscriber, please let me know. (Send one 6 X 9 inch manila envelope and 75 cents postage for the lot).

Next month, a full-scale examination of WF1B, Ray's contesting software. Please get your comments in early, folks.

73, G/L, G/DX

de Jim ,N2HOS SK ■

Packet. These programs are available for several computer platforms. If you have a computer already, make sure that you buy the correct program for your data controller and computer combination.

If you do not have a computer already, there are several ways that one can proceed to talk to a data controller. The CHEAPEST way to talk to a data controller is with a good old fashioned computer terminal. They can be had at a ham or electronic swap for a few dollars. Admittedly, this is the barest of bare bones systems. No printer can be directly attached unless some form of sharing can be arranged or an intelligent terminal that has the ability to drive a printer directly from the output. From there, you will probably end up buying a computer. You can use ANY computer that has a communications program available for it. The computer can be anything from a Commodore VIC-20 to a CRAY Y-MP computer. But seriously, what kind of a computer would you really need. This should be determined by your present/future needs and plans. If you want it for light use and really do not care for the bells and whistles, get a Commodore C-64 and the software to go with the appropriate data controller that you have selected. If you want to get real fancy, a 486 running some form of multitasking operating system, like Windows, Desqview, OS/2, or UNIX should be your choice. I am running UNIX here driving a phone modem, two TNCs, two printers, a computer terminal, all with a 386 with 4 MB(!) of memory.

What I told you earlier about planning and creating a plan applied here. I knew I wanted to run UNIX and that I had all of this equipment to address. I asked myself, "what was the best way for me to achieve this?" This took me some time to achieve but my final goal was eventually realized. I now have a system doing the job I want done.

In the process of determining the hardware that you want to use, talk to your friends. Find out their opinions and see what their systems are like and how they operate. This is how one should formulate opinions on what to do and how to do it.



PACKET

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LAST MONTH

Remember last month? I mentioned that I was doing something in the article that was being done in the business community and that it was going to be pointed out in this article. Well, the answer is that there was no semblance of order to the article last month. It simply jumped all around, back and forth, between subjects. All in all, the article lacked a game plan. Many companies do that when they start out with a new project. This month's article will not be that way and we are going to progress from "soup to nuts" in a sane, logical order.

DEFINE THE PROBLEM

The problem as defined is: "I want to get into packet", or better yet, "I want to get into the digital modes." Well, what modes do you want to operate or monitor. If it is Packet only, then there are many units that one can purchase. They are available from AEA, Kantronics, MFJ, DRSI, PacComm, and TAPR. The units avail-

able allow for one active port and there are some that allow for two active ports.

If you are interested in participating in more than just straight Packet, then one of the many makes of multi-mode data controllers would be appropriate. These multi-mode controllers handle Packet, Baudot, Amtor, ASCII, Morse, and FAX. Some multi-mode controllers do things differently than others, so ASK questions and STUDY the ads in the publications.

One thing that bears mention. The major manufacturers of data controllers are furnishing software front-ends for use with their products. Some of these are simple interfaces, such as the AEA Com-Pakratt for the Commodore 64, to the new Pacratt version that runs under Microsoft Windows. (Now there would be a program to review.) I know that MFJ also has a program for their TNCs. These programs make using the data controllers easier for the average operator who wants to do more that

HARDWARE

Now that you have figured out your goals and what you want to do, now comes time for defining what hardware you need to meet your goals. Let's first start out with TNCs or data controllers. Kantronics, AEA, DRSI, PacComm, MFJ, and TAPR sell units that deal with just Packet. Some are quite small and others are somewhat larger. There are units that can be powered off of NiCads and there are others that are real power pigs. In reference to power, the first available TNCs were power hungry. They needed all of that power because of the chips used at the time were power inefficient. Now with the improvement of solid state devices, TNCs don't require that much power. The front panel LEDs are now the power pigs. If you are going to be running your system off of emergency power, make sure that you have a TNC that is not power hungry. As a nasty example, the AEA PK-232 multi-mode controller eats 700 ma. at 12VDC vs the Kantronics Data Engine that uses a meager 150 ma. at 12VDC. I can power four Data Engines using the same amount of power that one PK-232 uses.

Do not let just low power use sway your decision on a Packet only controller. One TNC may have some features that you want and consume more power to achieve the desired result because of the increased circuitry. Here again, you have to weigh the benefits of one model against another, based on your plan.

With multi-mode controllers, the decisions become more interesting. The various models offer special features that other models do not. Here again, it pays to shop. In order to use these features to their best advantage, one should use the communications program that is written for the particular unit and machine that is being used. A Commodore C-64 may be great for text applications but it will surely not handle the reception of gray scale FAX as well as a PC based program can with a VGA color card in 16 level gray scale mode.

Earlier, I had mentioned that the cheapest way to talk to the TNC was with a computer terminal. Some are just plain dumb terminals while others have a rudimentary intelligence

and can be hooked up to a printer. This would make a quick station setup with minimal investment and quite portable, providing you had power for the terminal and maybe the printer. Here again, that is the cheap way to go. From there, you have several other paths that you can follow depending, of course, on your present and future needs and desires.

For a simple computer system to talk to the TNC, you can use the Commodore C64. This unit has become quite popular because of the low cost, the availability of the unit, and its ease of use for the novice computer user. The keyboard unit houses the processor and the communications ports along with the video monitor output. There is also a port on the unit for plug in program modules. It is this port that you would use to make the C-64 talk to your particular TNC with the dedicated software. As an example, to talk to an AEA PK-88 with a C-64, you would use the AEA Com-Pakratt cartridge. No disk drives to fool with or computer disks to get erased. The whole system is neat and small.

Probably the most popular system to use to talk to a data controller is the PC compatible computer system. This platform has the widest range of software available for communicating to data controllers. Another reason for the PC popularity is just because of the sheer number of installed systems. When the first PCs came out, they were thousands of dollars. Now you can get a system for less than \$300.00 if you build it yourself and do some careful shopping.

There also are other platforms being used right now, such as, Amiga, Macintosh, and several others. Some of these systems lack software but as more and more units come on line, software writers are coming forward with programs.

SOFTWARE

Probably the most basic of all pieces of software that you could use to talk to a TNC is the plain vanilla terminal communications program. This is the same stuff that you use to talk to a phone modem or BBS over the phone lines. You would have to learn how to use all the commands of the TNC that you are using and then talk to the unit directly. If this approach is used with some of the multi-mode units,

then some of the advanced features may not be functional.

Aside from using just the terminal communications program, one can buy the software that is offered by the manufacturer of your TNC that is compatible with the computer that you are currently using. The software provides a great interface for you to use and allows you to upload and download files, logging, multiple connects and other neat features that are dependent on the program and the TNC's capabilities.

This can be applied to the multi-mode controllers from AEA, Kantronics, and MFJ. These programs serve as an interface and remove you from having to know all of the commands yet provide you with a service that allows the user to access all of the capabilities of the given unit. The philosophy of "one size fits all" applies here. The programs are designed to exploit their particular unit to the utmost possible for a given computer system. This allows you to see FAX and be able to receive multiple Packet connects at the same time. I know that the Kantronics KAM and the Data Engine allow you to have both ports active and you can monitor and switch between the two ports at will. This capability can be exploited for contests while you are working HF and using a (detestible) spotting net on the VHF side. Spotting nets are a thorn in my side but that is another story.

Usually, software is available from the dealer where you bought the TNC. There are times when dealers may cut a deal and allow the software to be bought for a lower price when bought as a package deal and not separately. You will have to ask and see if one of these deals is being offered at the time of purchase. So, software is a must to have and allows you to use the TNC to its fullest.

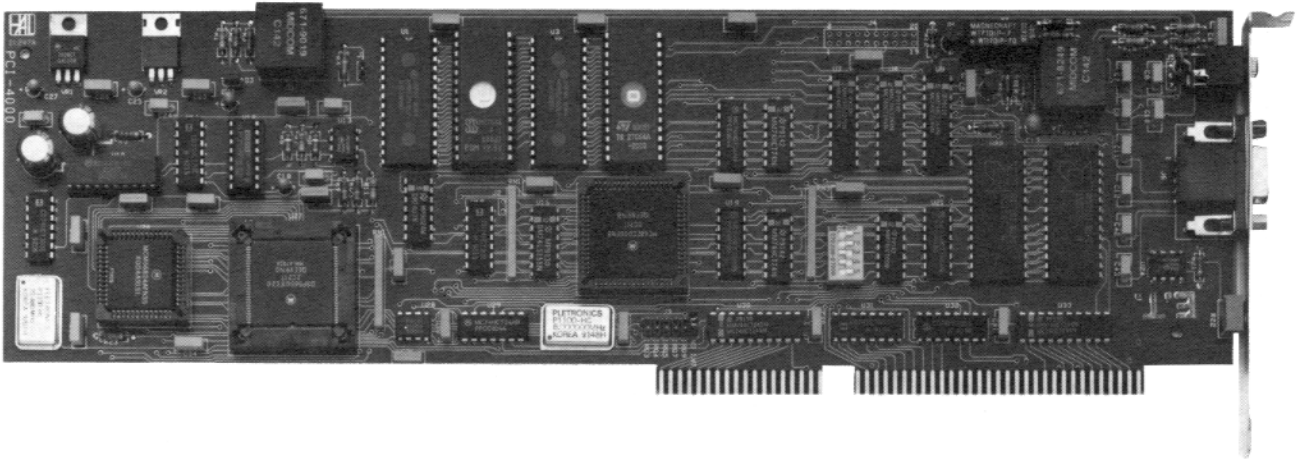
PUTTING IT TOGETHER

Wiring up the whole thing, is the hardest part. There are so many ways to hook up a TNC to a radio that it gets to be a bit mind boggling. Each make of TNC uses a different scheme to bring signals out and each radio manufacturer uses a different scheme on their microphone connector. The resulting nightmare can really give you gray hair fast. The enclosed

NEW!

HAL Announces the PCI-4000 PC-CLOVER System

For Fast, Bandwidth-Efficient HF Data



The PCI-4000 uses the latest development in HF data transfer methods—CLOVER-II. CLOVER-II is designed to maximize the amount of data which can be transferred in a narrow bandwidth over HF radio frequencies. It uses a combination of four tone frequencies with phase and amplitude modulation to achieve data transfer rates as high as 60 characters per second—about ten times faster than AMTOR. The PC-CLOVER system incorporates Reed-Solomon error correction, not simply a retransmission scheme. The PCI-4000 is a full-sized PC card which operates in a 80286-based PC or higher.

The PCI-4000 PC CLOVER system features:

- ♣ Higher throughput than RTTY, AMTOR, Packet, or PACTOR on similar HF channel
- ♣ Simple pull-down menu operation
- ♣ Signal bandwidth of 500 Hz (@50 dB down)
- ♣ Plugs into your PC (286, 386SX, 386, or 486 machines)
- ♣ Easy interface to your transceiver
- ♣ Automatically adapts to HF band conditions
- ♣ Error correcting using Reed-Solomon error correction

You've read about it in the articles. Now you can operate CLOVER!
Order your PC-CLOVER system today from HAL Communications Corp.

PCI-4000 PC-CLOVER System

Only \$995.00



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Urbana, IL 61801
Phone (217) 367-7373
FAX (217) 367-1701



manuals that come with your particular TNC are always updated with the latest from the radio manufacturers as to what wire goes where. Luckily, that usually is four wires. If that confusion is too much for you, or you are planning to use your TNC with many different makes of radios, Oak Bay Technologies¹ makes a neat adapter that allows one connector to take on many different personalities. They have one for mobile/base radios and another model for use with HTs. One of these two units will solve your problems involved with wiring up your TNC to the radio. The adaptors are available from your local candy store and come with easy to understand instructions.

Wiring up the TNC to the computer is a straight forward task. This delicate subject is covered in much detail in the manual supplied with the unit. If you have a TNC that uses a DB-25 connector and your particular computer uses a DB-9 serial port connector, then you need an adapter. If both are the same pin count, all is fine. But if not, just buy the corresponding adaptor cable and hook it up. The TNC is wired up as a DTE system and the computer is wired up as a DCE system. In this system, like can't talk to like directly but opposites do just fine.

On just about all TNCs, there is an autobaud routine that comes on the first time you power up the TNC. Most TNCs default to 1200 baud to start. Unless you are running a system that has a 9600 baud modem in it, like the Kantronics Data Engine, there is no need to run a higher port speed than 1200 baud.

TALKING TO THE TNC

Now that you have all of the necessary hookups made and added to the rats nest, what does one do with this thing? I will leave this subject to the manuals that you should have read before installing and wiring up this system. Some manuals are a bit on the technical side and some are not. There are also some publications that cover the subject quite well. Two recent publications to hit the market cover the subject in detail. One is written by Dave Ingram, K4TWJ. It is named "How to Get Started in Packet Radio" and it is published by the National Amateur Radio Association

(P.O. Box 598, Redmond, Wa. 98073). The other is written by Steve Ford, WB8IMY and is named "Your Packet Companion" and it is published by the American Radio Relay League (Newington, CT. 06111). I recommend both publications for both the Novice and the experienced Packet user. One other new addition is the video tape for beginners of Packet radio available from CQ Publications (CQ Publications, 76 North Broadway, Hicksville, NY 11801, phone (516) 681-2926).

Probably the best way to learn how to use the system that you have is to play with it and ask questions of experienced Packet users. May I ask one big favor of you --- NO BEACONS! They are not needed anymore. They were great in Packet's infancy but they are not needed anymore since the mode is so popular. All beacons do is waste precious bandwidth on congested channels.

ONWARD AND UPWARD

From the keyboard-to-keyboard and the keyboard-to-BBS worlds, Packet has developed into a networking system that covers both the local area and the world. This was the result of store-and-forward BBS operations working over both HF and VHF bands. This is how we forward all of the mail that is sent over Packet daily. There is much traffic handled, both useful and useless, through BBSs that are linked together.

Aside from the BBS linking that is going on, there is the networking that acts almost like an ethernet system when used to link computers in businesses. One version is TCP/IP that was first proposed by Phil Karn, KA9Q, many years ago. Now there are versions of the software for just about any platform out there. And if the compiled code is not available for your particular machine, the source is available for you to tinker around with, if you are the adventurous type.

This software allows you to perform many functions at once. You can be reading mail off of your own BBS, chatting to someone else, and transferring a file, all at the same time. There are even some sites that have tied into the internet to pull off the "ham band legal" news and allow that to be fed to the local users group automatically.

THE FUTURE

The future of Packet is here. Because of the unreliability of the HF bands for forwarding messages, there is a project that uses HamSats to forward traffic to other parts of the world. This is a great project and shows how technology can be used to help in information transfer. Because of the crowding of the VHF and UHF bands, microwave will have to be utilized. There are easy ways for people to use microwaves and the construction of microwave equipment is becoming popular with the pursuit and allows for higher speed linking and all of the attendant throughput that can result from it. Megabit-per-second transfer rates are capable on the microwave bands. This is the future band for networking, both on a local basis and on a wide area basis. It is there, all we need to do is use it. But then again, if we do not use it, we will lose it.

Have fun with the mode. Ham radio is meant to be fun and this is one of the best ways to do it. The initial investment is not that much. I started out with a PK232, my ICOM 02-AT, and a Ringo Ranger and a dumb terminal that I bought for \$10. I now have two TNCs, a 386/387 based computer running UNIX, and I still use the tried and true 02-AT with an amplifier. The hobby is still fun for me.

de Richard, N6NKO ■

Packet: n6nko@wb6ymh-2 internet:

elroy!swc!owlsnest!richardp

¹ Issaquah, WA (206) 557-9611

Continued from page 2

You may be able to go some place else for less but you will miss the camaraderie and fellowship you will enjoy by attending this gala event. Also, I have been able to persuade Bill Henry, K9GWT, to give a presentation on the past and future of the Digital modes. Bill has extensive background in the digital arena and whether you are a newcomer or old timer to the digital modes, I feel pretty certain you will enjoy what Bill has planned for us. Even after enjoying a wonderful meal, I don't think you will fall asleep during his presentation. Dinner details page 22.

All for this month.

de Dale, W6IWO ■



HARDWARE

Jay Townsend, WS7I
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Quite a number of interesting things in the MailBag this month. First was a letter from the ARRL's Executive Vice President, K1ZZ. It seems that we agree to disagree about band plans and other digital items. Also I received a nice letter from Bill Henry of Hal Communications who answered a couple of questions. Bill is very busy with all the CLOVER units being shipped. Seems they have over 100 already 'twittering' on the bands. Also had some great conversations with Jim Newcomb of AEA about software and new products. We have been promised a look at the new PK-900 and some other new items. Phil Anderson, W0XI, the President of Kantronics phoned and we finally have the PACTOR EPROM and the KPC-3 which have arrived and await review.

Alex, WB6AFJ, is looking for someone to give him a hand with WF1B software and a 386 computer using the CP-1. If you can help Alex with this, please give him a call at 408-258-1128. Jimmy Moss, W5GRJ related in a lengthy letter his experiences with one of our advertisers. Jimmy, I have forwarded your letter on to the Editor and to the company concerned. Let me know when and how your problems get resolved. Found an interesting tid bit from John Albert. He has a new filter circuit called the "Bowtie Filter" that will soon be available for AEA's PK-232. It improves filter response and provides maximum mark/space separation. The filters will be available from Willco Electronics, P.O. Box 788, New Lenox, IL 60451. Haven't seen or tested this unit but very definitely an interesting idea.

BEGINNERS CORNER

This month is our annual beginners corner and this year I want to do something a little different. In the

past we have had a lot of technical information about interfacing to various units as well as some discussion on hardware items. This year I want to briefly look at the the digital modes and what is required and what is needed to get started with digital on HF and VHF.

DIGITAL ON VHF AND HF

There are quite a few differences between HF and VHF digital operations in today's ham radio. Almost all digital activity in the VHF spectrum is on Packet. In years past there were a number of RTTY repeaters and some simplex RTTY. However, the improvement that Packet brought in error-free communications and speed has led to the virtual abandonment of RTTY in the VHF parts of our bands. Packet is found on 2 meters and most other VHF bands. Usually there is a local BBS (Bulletin Board System) that carries mail for your local area, be it a town, city, or smaller area. This BBS is normally associated with a digipeater which is a device usually on a high hill or building that can hear all the users below. Often this digi (shortened term) is connected to a LAN (local area network) which connects to other cities, states and countries. Using a rather simple address system you can send mail to hams all over the world. The format varies slightly and the best way to find out what it should be is to drop the local BBS Sysop (system operator) a note and find out how his system works. An example of the address would be my own found at the end of this article.

Expansion in the VHF area in the last few years has brought higher speeds and ever more useful software. Perhaps the largest overall increase in users was created by AK1A's Packetcluster (R). This is a set of software that permits DXers and

others to access a lot of different databases. It is used primarily to spot (find) rare DX stations and list them so others can work them. Contesters use the clusters as well as many other people. Databases on the clusters carry callbooks, QSL managers, weather info, and a lot of additional information. They are multi-user (many users at once) which makes for a little bit slower access, but concentrates many people on a given frequency.

For the future on VHF, I will predict that by the end of 1993 most of the users will be moving to 9600. This will eliminate many of the bottlenecks that are now found and make a lot of exciting new things available in software and system design.

WHAT ARE THESE MODES

What are these sounds and noises? In days past we had RTTY and you will still find most references to RTTY. RTTY is radioteletype and really got going in the 1950's after World War II. It once was a mechanical marvel and can be likened to two typewriters hooked together. Today it is just one of many digital modes and mostly done on computers. RTTY is used in most of the contests, DXing, and casual ragchews. There has also been a vast autostart (automatically started RTTY) network and surprisingly it is even making a comeback. For those looking for Hal, WA7EGA, check 3612.5 as the old guy is back on autostart. There are also some BBSs on RTTY.

AMTOR (amateur teletype over radio) is another digital mode. It comes to us from shipboard activity and has two different methods of use. FEC (forward error correction) and ARQ (I can't remember this one!). FEC sounds much more like RTTY and is generally used to start a contact. Then stations switch to ARQ which is the chirping sounds you will often hear on the bands. AMTOR is now perhaps the dominate digital mode and has replaced RTTY to a large extent. APLink is a form of AMTOR used by stations for handling messages.

ASCII (essentially raw computer language) as far as I know is not used on HF or VHF to any extent. I once got booted from the local RTTY repeater for running 110 baud ASCII. Always

included in multi-mode TNCs (terminal node controllers) but pretty useless.

Packet is found in a large number of places and is in wide use on the HF bands. Packet is used in automatic mode by members of the STA (special temporary authorization by the FCC) for message handling. It is used by certain PacketCluster (R) stations to inter-connect different areas of the country. Many users are also found keyboarding (keyboard-to-keyboard) on HF packet.

FACTOR was developed by a group of German Hams and introduced in 1991. This year has seen an explosion of FACTOR on the HF bands. It is a hybrid mode providing robust digital communications using automatic baud rate selection, data compression, optimal message length, and other advanced techniques. All major multi-mode TNC manufacturers will have this available in 1993. It is a clever amateur radio alternative.

CLOVER is a hardware and software implementation of CLOVER modulation (patent pending). It is currently a unique method and has a unique sound and bandwidth. Clover will probably replace most packet as the HF message forwarding king. Very high speed is possible with this product. Clover has been developed for the PC clone type computer only. Only very recently the WORLI BBS software became available for this mode.

WHAT FREQUENCIES DO I FIND THEM ON?

A rather large shakeup in the digital bands has occurred and is continuing to occur as we write this column. I expect that we will be working on gentlemen's agreements for the digital modes for the next few years as things evolve. But let's take for an example the 20 meter band. Twenty is perhaps the most popular digital band. Where are digital signals found? Currently, AMTOR is found from 14.065 to 14.080 with a mix of APLink and keyboarders in all areas. FACTOR seems to have become concentrated in the area 14.075 to 14.085 with most about 14.081. RTTY is found from 14.080 to 14.095 with most now in the segment 14.085 to 14.092. During contests or if there is a rare DX station on the RTTY guys

spread from 14.060 to 14.110 or so. Packet is mostly 14.100 to 14.117 with some activity from 14.095 to 14.100. There are a couple of foreign stations below 14.095. All of these frequencies are the Mark frequency. That is another confusing term in the digital modes. Many of the newer modes and newer people use LSB which doesn't read the same. The SSB rigs using the LSB method read 2.1 KHz from Mark. So it makes discussions always confusing. (See The Link column)

Other Ham bands are similar to 20 meters with a lot of sorting out still occurring. That's the interesting thing about the digital modes. They continue to evolve and it's so dynamic. So along with the fun of written communications comes being at the forefront of change.

WHAT DO YOU NEED TO GET STARTED

We have looked now briefly at what digital modes there are and where you might find them. Now let's examine what you need. Let's assume that you have some antennas. When it comes to rigs these days things are much easier than in earlier times. Most of the modern transceivers fit right in with digital. Some are even pointed toward their use. You need a stable, well calibrated rig and one that is capable of extended heavy duty use. Digital modes demand a pretty hefty duty cycle of the transmitter. A specialized RTTY mode while desirable isn't required.

The terminal unit or demodulator is the next major piece. There are any number of these units available. Some called Multi-mode units do almost all the above mentioned modes. Some are specialized and do only a certain mode. Probably the best start is one of the Multi-modes. Those that I would recommend are the AEA PK-232MBX, the Kantronics KAM, and the Hal Communications PCI-3000. The way to select one is to study the various reviews. Many are found in this column. Ask your Ham friends and compare features and performance. There really isn't a perfect one and you will find that the manufacturers make them slightly different so that they can fit into one niche or another.

There are less expensive ways to get started, but frankly, I have found

that they are best left to those with experience. A good local guru or Elmer is often the best way to get started. Some Hamfests feature units from \$50 to \$200 that often will fit the ticket.

Modern digital communications usually are associated with computers. The most popular by far is now the PC clone. Others are certainly found and even "dumb" terminals can be used with most Multi-mode controllers. The actual computer really isn't all that important and you will find that like most things they tend to be used for a lot of other duties.

HOW TO HOOK UP THE STUFF

These days all of the units that I have examined come with nearly perfect instructions. The manufacturers have done an excellent job and they include diagrams of the various plugs and even diagrams for most of the commonly found radios. One of the things you will encounter is the old AFSK (audio frequency shift keying) vs FSK (frequency shift keying) debate. In 1993 there isn't really any practical difference. Even if the rig has a RTTY spot it probably is doing AFSK keying. The major difference is the ability to use the narrow CW filters while using the digital modes which is a tremendous asset.

SOFTWARE FOR THE DIGITAL MODES

This is actually the point where most of the problems occur and there isn't a very good solution. The Ham Radio market is rather small and there are a large number of programs that are available to users. Most are good and will work. Most aren't very user friendly and a great deal of time and knowledge is often necessary to get things working. Perhaps the best thing to do is to start with the program that the TNC manufacturer has available. The reason for this is that help will be available from a single source. All of the three above mentioned manufacturers have software that either comes with the unit or is available at additional cost. You can use shareware or freeware which is also widely available. Again look to the pages of the RTTY Digital Journal for reviews of software. There are a

number of items available and even simple phone line modem programs work in many cases.

Software also tends to be very user specific and I know that many people have very specific ways and things they like about packages. Your Elmer would again be a good source for suggestions.

WHAT CAN YOU DO WITH IT

This is perhaps the most exciting thing of all about the digital modes. They offer the ability to meet the best people in the entire ham radio community and to do the newest, the most interesting, and the most challenging things in ham radio. When you think of ham radio you think of foreign stations. Digital modes bring them ever so much closer than any other mode. Foreign languages are much easier to type at a fairly slow rate. Sixty words per minute and a couple of operator guides lets you get started. DXing on the digital modes is a real challenge. Recently the first DXCC Honor Roll was issued. Contesting on RTTY is the fastest growing contest mode in the world. Good rules, and good spirited competition has led to a lot of fun.

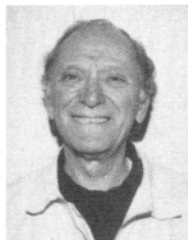
The digital hams pass all of those wonderful messages and bulletins for the rest of the ham community. Personal mailboxes, autostarts, BBS, and other forms of messaging are growing, returning, and expanding. Even the Oscar satellites are now heavy into digital use.

The digital modes are the frontier of ham radio. Don't you want to be the first in your area on PACTOR, CLOVER, GUATOR ? The last mode by the way I have just created. Things are happening that quickly. Join the fun and send your questions into me and I will seek answers for you.

73, and hope to Chirp, Squawk or Twittle you soon on the bands

de Jay, WS7I ■

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DX NEWS

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If you are new to the wonderful world of high frequency digital communications, let me extend my hand and wish you a hearty welcome. As is evident by the heading of this column, this portion of the RJ is concerned with sharing with you the fascinating aspects of DX operation on the HF bands. Most keyboard to keyboard DXing is done on RTTY, with an increasing amount occurring on AMTOR. The new techniques, like PACTOR, and CLOVER are mostly in the formative operational stages, and have not yet established themselves as viable in this aspect of the hobby. This may change with time as new operating modes are developed. HF packet is not widely considered as a reliable conversational mode, and is not discussed here.

If you are migrating from CW or SSB DXing to digital DXing, you will find that contacts are made in very much the same manner to which you are accustomed. Conversational QSOs are established by calling CQ, answering a CQ, or a QRZ?. Selective area CQs (e.g. CQ Pacific) are common.

Most RTTY QSOs with DX are carried on at 60 wpm (45.5 baud), although you may sometimes find a foreign station using 67 wpm (50 baud). This will be evident if you are getting less than perfect copy with a 599 QRM-free signal. In that case he is probably using old equipment and cannot change. Adjust your baud rate to match his. Also be alert that a station unknowingly may transmit in USB instead of the commonly accepted LSB mode. He may or may not be able to read your LSB signal. Advise him to change to LSB, if you can make the contact.

Very little RTTY DXing is done on 160 and 80 meters. 40 and 80 meters can be quite active during RTTY contests. Most favored bands are 15 and 20

meters. When we are in a favorable part of the sunspot cycle, 10 meters can be active...but we are past that now for Cycle 22. There is practically no RTTY activity on 12, 17, and 30 meters, without having a prior agreed-upon schedule.

For some down to earth operating suggestions for RTTY DXing, see the sidebar entitled "RTTY DX Operating Hints."

To raise a DX station on AMTOR, you call CQ very much the same as on RTTY or CW, except that you must use the FEC mode (sometimes called Mode B) and you include your Selcal in addition to your regular callsign. Most newcomers get frustrated when starting because they do not seem to be able to raise anyone. The trick, taught me by Eddie, G0AZT is to allow plenty of idles, at the beginning, and in the middle of your calling. Without sufficient idles, listening stations will not be able to "sync" with you.

FEC AMTOR runs at 100 baud, so it sounds like very fast RTTY. A station answering a CQ sent on FEC will normally do it by transmitting the caller's Selcal in ARQ (sometimes called Mode A). You can recognize that you have connected either by ear, or by looking at your monitor scope. Of course, you may also answer in FEC, and carry on your QSO in FEC, but if conditions deteriorate, since there is no error correction as in ARQ, you may lose the QSO.

There is also much DX activity via the world wide APLink mailbox network, but that is a subject for "The Link" column elsewhere in this issue by Jim, KE5HE.

To keep current with RTTY DX activity, copy the weekly "VK2SG RTTY DX Notes" which come out every Friday and are carried by many APLink mailboxes, as well as by the mailboxes on the National Autostart Fre-

quency (14.085 625 Khz Mark) which run at 100 wpm (75 baud) RTTY. And of course, every month this column brings you the latest in DX News.

DX DOINGS

ANTARCTICA, DP0 - We have recently seen DP0GVN at Neumayer Base show up on 20 meters around 1915Z. QSL to DL1JCW.

BANGLADESH, S2 - For those of you who have given up on getting a RTTY card from S2/HA5BUS, there is hope. S21A has been active on 20 meters between 1200Z and 1400Z. QSL to W4FRU. There will be no problem with QSLs from John Parrot. David, KK4WW and a group from the Foundation for Amateur International Radio Service (FAIRS) will be in Bangladesh in early March to set up an AMTOR facility at the National Radio Club. This would hopefully eventually become part of a world wide emergency network. A radio is being donated by David. John, N0ISL has donated a TNC and computer. So perhaps we will see additional digital activity soon.

BELARUS, UC - (formerly Byelorussia) UC2OCJ may be found on 20 meters around 1415Z. QSL to Vladimir N. Prihodko, Box 268, Gomel 240270, Republic of Belarus.

BELAU, KC6 - The all band, all mode operation by KC6SS, KC6RR, and KC6OK is scheduled to run through 28 February. QSL to P.O. Box 73, Owasso, OK 74055.

BOUVET, 3Y - There is no further information to add to our report of last month of a proposed Russian operation in April-May by 3Y/R0L.

CZECH REPUBLIC, OK,OL - As of the beginning of February, we don't know if the DXCC will delete the old Czechoslovakia, OK, and replace it with a new OK for the Czech Republic, but in case you need it as a new country, look on 15 meters for OK1KSL around 1550Z, and OK1MP around 1630Z. The Czech Republic is continuing to use the QSL Bureau at Box 69, 11327 Praha 1.

ETHIOPIA, ET - It looks like we may have a break through here. With a new government in place, it has been reported that five foreign hams have already been licensed, and licenses for Ethiopians may be imminent. There was a report in the middle of

January that a RTTY station signing ET3YU was on 15 meters at about 1415Z calling CQ, followed by a steady MARK tone, and then nothing further. This station was also reported as having been worked on CW, one day, on 20 meters around the same time of day. He gave his QSL address as Box 60349, Addes Abeba.(sic) Keep ears/eyes open.

FALKLAND ISLANDS, VP8 - Look for a new VP8 callsign from here about this time. Jon, VP8VN has left the islands but the digital gear will remain and be used by a new arrival who will be sporting a brand new VP8 license. Incidentally there is a very active digital contingent in the Falklands including Bob, VP8BFH, and Peter, VP8WA. Both are very active on AMTOR. Bob operates a PAMS mailbox on 21070/14066. Peter has recently obtained his CLOVER board and is looking for contacts on this mode. If you would like to make a schedule with him drop a note in the APlink mailbox of CE3GDN. (For the frequencies of CE3GDN see the footnote at the end of the DX News.) Peter also operates Pactor. So you see, these remote locations do not lack of the latest in ham radio technology.

Incidentally both Bob and Peter were involved in the support of the VP8SSI DXpedition to the South Sandwich Islands last year. Peter acted as local liason and facilitator. Bob was part of the crew on the "Abel-J."

GUINEA-BISSAU, J5 - Mark, J5UAI should be up and running by now with his new tri-band beam, amplifier, a TS-430, and RTTY gear. He will be there until June 1994. QSL via Cecil Williams, NW8F, at his new address, 975 Kittle Road, Wheelersburg, OH 45694. (Tnx OPDX/BARF80/QRZ DX)

HOWLAND ISLAND, KH1 - The AH1A expedition was apparently a great success on all modes. However, in the opinion of one European RTTYer, Europe was not given sufficient RTTY opportunity when propagation was favorable, and signals on other modes were very strong. Tapani, OH2LU, writes "... after all promises on 'serving especially Europe needs' I lack AH1A in my RTTY log. But them my JA friends report they had together with USA stations a ball at hours like 0300Z,

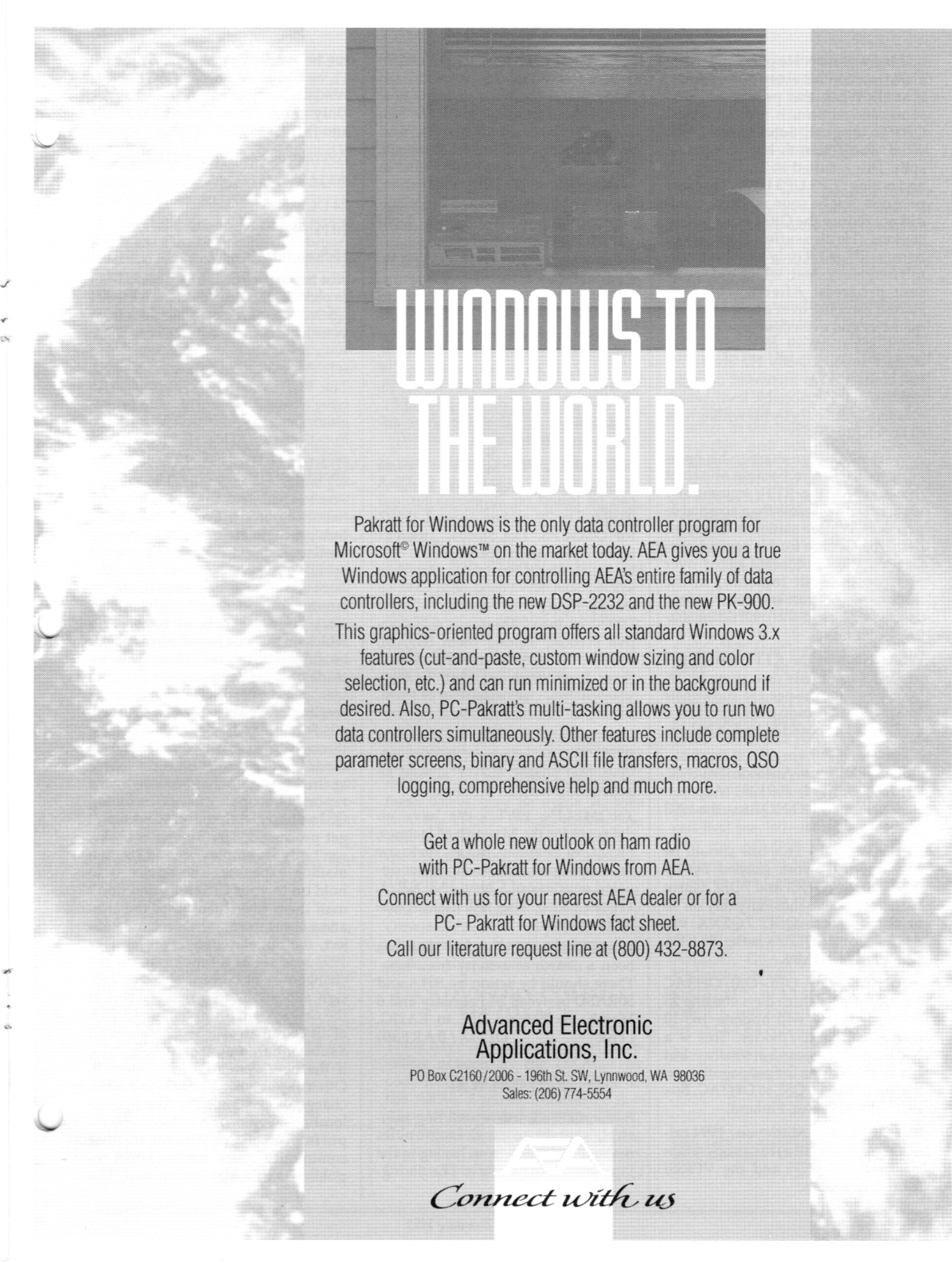
0500Z, 2300ZZ when any of the three HF bands were closed here. But at 0600Z until 1100Z there would have been great chances to work Europe also on RTTY... I spent countless hours listening to them on CW and SSB, and even working them but my pleas for RTTY schedules were met with deaf ears. So pass on my concerns to the group that otherwise did a fine job. Maybe the forthcoming DXpedition to KH5-lands might take us better in consideration." His practice of listening 2-10 Khz up spread out the callers allowing all a reasonable chance to catch him. QSLs go to P. O. Box 1, Franktown, CO 80116.

KINGMAN REEF, KH5K - PALMYRA, KH5 - This well organized expedition plans to come on the air on 5 March for nine days. Of the 12 operators, eight will land on the reef and the four others will proceed to Palmyra. The RTTY operation on Kingman will be with the IRDXA HAL #1, and that on Palmyra will be with the IRDXA HAL #3. The RTTY group, Pete, N0AFW and others will bring their expertise so ably demonstrated last year on Clipperton as FO0CI. Kingman Reef is high on the RTTY Need List so we can look forward to some interesting action. With well equipped stations including beam antennas, we can expect to hear substantial signals. Callsigns will be N9NS/KH5K, and N0AFW/KH5. QSLs for N9NS/KH5K go to N9NS, while those for N0AFW/KH5 go to WA2FIJ at his '92 or '93 CBA. Kingman Reef is high on the RTTY Need List, especially in Europe; we hope optimum use will be made of area band openings.

LEBANON, OD - OD5PL has been very active on 15 meters around 1300-1430Z and on 20 meters around 1745Z. QSL to HB9CRV.

MADAGASCAR, 5R8 - It has been a pleasure to see how George, 5R8DG, has so enthusiastically taken to the RTTY mode. Thanks to the efforts of Don, W6PQS, and Dean, WA6PJR, of the International RTTY DX Association (IRDXA), Madagascar will soon be off of the Most Wanted RTTY Countries list. Equipment sent late last year from IRDXA has been put to good use.

When George first came on, he operated only transceive and was continuously frustrated by the bedlam



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on his frequency. He generally made about one contact every five minutes, if at all. When this proved too tiresome, and not much fun, he would QRT in disgust. Subsequently, the word was gotten to him to operate split. This resulted in his calling CQ and noting "UP3 UP3 UP3". That was progress, but he soon realized that it did not reduce the QRM from calling stations. (He also suffers from lack of narrow filters.) It only kept his transmit frequency clear, which did represent progress. After a while, he started listening over a spread of frequencies and even developed, at one point, a pattern of catching a new contact some 300-500 Hz above his last contact. This increased his QSO rate to a more reasonable level, which was tempered only by his willingness to be "chatty".

As we saw George sharpen his operating skills, it also became apparent that some of the RTTY community were reverting to less than acceptable practices. While a station in Ohio was thanking George for his second contact, a station in Florida called over him (on the split frequency) in the middle of the transmission. George properly ignored the overriding station in Florida.

While much of the RTTY world still needs 5R for a new one, some RTTY DX Hogs have the need to show their "machismo." C'mon guys, give 'em a break. It's supposed to be fun hobby.

QSL 5R8DG via Antoine Baldeck, F6FNU, B.P. 14, F-91291 Arpajon Cedex, France. DO NOT use the 1993 callbook address.

MALAWI, 7Q - This one should be way down on your needed list by now as both 7Q7XX and 7Q7ZZ have been very active most any day on 15 or 20 meters. QSL 7Q7XX via JH3RRA, and 7Q7ZZ via the '93 CBA or later of JA1UMN.

MARKET REEF, OJ0 - OJ0/OH3AC will operate for three days starting 25 February. They will operate 160-10 meters, all bands/modes. This is a bad time of the year for weather. but is a favorable one for propagation on the lower bands. QSL to OH3AC, Box 74, SF-15141, Lahti, Finland.

PETER I I., 3Y - Mark your 1994 calendar (early months) for an operation by Tony, WA4JQS and the VP8SSI team. More later.

PITCAIRN ISLAND, VR6 - VR6BB came up as planned in the middle of January and has been giving a new one to the deserving. Look for him around 0730Z on 20 meters, and around 0015Z or 1830Z on 15 meters. He will be there until some time in March. QSL to JF2KOZ, Yuji Miura, Room 100 Main Haitzu, 7-3 Yanagi-gaok, Tahara Atusumi-gun, Aichi 441-34, Japan.

SAN ANDREAS & PROVIDENCIA, HK0 - Look for Don, HK0/AA5AU and Silvano HK0/KB5GL to burn up the bands from San Andreas between 27 February and 7 March. Don will operate 10, 12, 15, 17, 20, 30 and 40 meters on CW and RTTY. Silvano will do 10, 12, 15, 17, and 20 meters on SSB and RTTY. QSL HK0/AA5AU to his home address, and HK0/KB5GL to KA6V.

SLOVAKIA, OM - OM3MM likes 15 meters around 1130Z, and OM3LA can be found on 20 meters around 0930Z. Try 20 meters around 1550Z for OM3CPS. The Slovak Amateur Radio Association QSL Bureau is at P. O. Box 1, 85299 Bratislava, Slovakia. **SLOVENIA, S5** - You should have no trouble filling your need for this new DXCC country. There are many active stations among them S59AM, S51CN, S53AA, and S52JI. When there is propagation from Europe, you will find one or another of them, mostly on 15 or 20 meters.

SRI LANKA, 4S - The International RTTY DX Association (IRDXA) advises that Shanti, 4S7WP should be active soon with an MFJ box.

TROMELIN, FR/T - We have no dates yet for the May trip of Jacques, FR5ZU to Tromelin, but we do know he is equipped with an amplifier donated courtesy of Chiru, JA3DLE/1. Thanks Chiru. That will make it easier for all of us.

WESTERN SAHARA, S0 - There has been a dearth of activity from here. There should be action by S01A and S0RASD between 24 February and 6 March. As before, QSL to EA2JG. (Tnx OPDX/BAF80)

POTPOURRI

Eddie, G0AZT, our wandering minstrel, sent in some demographics manually gleaned from his log in the Japanese JARTS contest. The young-

est he worked was UL7PBY at 14. Three old timers were G6GL at 80, W8GKM at 82, and W1GKJ at 83. Only three females, N4LIH, I5ICY and JMI4VD were logged.

Average age of those worked:

33 JA's = 42

24 DL's = 46

18 I's = 43

15 Scandinav's = 50

Not having a PC, Eddie decided not to pick out the USA data from his 804 QSOs. Are there any other data from your log that you would like to share with us? This is the only contest in which meaningful data is exchanged. The RST system was supposed to have allowed for world wide propagation analysis, but that idea died a long time ago. At least the JARTS contest exchange tells us something about ourselves.

There is bad news about the status of ham radio in the Commonwealth of Independent States (CIS), formerly the Soviet Union. A bulletin authored by Ed Kritsky, NT2X and Andy Fedorov, RW3AW disseminated in January provides an insight into it. Very soon, aspects of ham radio which, in the past have been free, will be subject to varying fees. This includes license fees, contest entrance fees, contest certificate fees, fees for sending cards abroad via the bureau, etc. Foreign mail is often not getting through to Russia. Accordingly, U-cards may start to become scarce again. They note that Moscow hams report piles upon piles of incoming QSLs at Box 88 that don't and won't get processed. The Bureau is broke, can't pay its employees and its own mailing expenses. The advice is to hold on to your CIS cards and don't mail them over there until the situation is resolved. On a related subject, the bulletin states that January 1993 was set as a timeframe for the changeover of current amateur call-sign allocations to a new system. If the new system is implemented, 95% of all Ukrainian calls will change and a substantial amount of Russian calls, if the new system is implemented. Other republics will see a full 100% change of existing calls. The new allocations were made without any input from amateurs. Thus the amateur community of the former USSR republics is in a state of turmoil. The

ITU was requested by representatives of the ham community to stop the new assignment. Government offices responsible for Communications were petitioned without any result. Truly this is an unfortunate state of affairs. We can only hope for an outcome which is favorable for our CIS brethren.

Congratulations to Luciano, I5FLN, who, as of the beginning of February, had 326 RTTY countries worked (316 accredited by the ARRL, nine additional cards on hand not yet submitted, and waiting for one outstanding card). With Gin, JA1ACB, that makes for two supermen in our midst. Nice going, Luc! Who is next behind with ARRL credits?

QSL LAMENTS

The quest for QSL confirmations is a never ending one. And if there is one aspect of DXing that can ignite passions, it is the long overdue, or "never received", QSL. There seems to be a never ending string of complaints, many of which contain proposals for disqualification of particular DXpeditions, accusations of theft, fraud, and what have you. There is no question in my mind that unless a station specifically states he does not QSL, we have a right to expect a confirmation in answer to a request. It is a tradition as old as the hobby. It is assumed, of course, that return postage and an SAE have been sent. If there is to be a delay in QSLing, due to travel, or printing, or anything else, the responsible DX station will get word out to that effect, and most people will be content to be patient. But that rarely occurs.

My own "overdue six months list" consists of:

S2/HA5BUS April 1992

4J1FS June 1992 (promised to go out January 1993!)

JP, AA2DU sent a message indicating he is so frustrated with lack of responses from FR5ZU that he is considering petitioning the ARRL DXCC to disqualify certain operations dating back to 1990. These are:

FR5ZU/J November 1990

FR5ZU/E September 1990

FR5ZU/T March 1992

I mentioned here last month that I had received my FR5ZU/E card for the September 1992 operation, but not one for FR5ZU/G, which preceded it by a couple of weeks. I would have to think I was the victim of postal theft, even though one would expect that the French Poste was reliable.

Earl, WA1MPB states he has worked Ted, HC5K in numerous contests, and bands, including when he was HC8K last spring. In spite of sending several SASE's with suitable enclosures, he has yet to receive a card.

In my November 1992 column I mentioned that Bill, AA4M/6, and others, have been frustrated in getting cards from the April 1990 operation of YV0AA. He also has considered petitioning for disqualification. A few weeks after that item was published, Ted, KR9O received his card. It's difficult to figure that one out.

All the above cases, by the way, included the sending of more than the minimum for postal charges. Mucho bucks are involved.

Finally, Bob, WB2CJL relates that checks sent to a manager on the West coast, to pay for commemorative certificates for the Pitcairn Island Bicentennial VR200PI/ operation in early 1990, cleared the bank but Certificates were never received.

As one to whom the years have imparted a small amount of wisdom and a sense of tolerance, let me caution against making brash statements and leveling of charges of fraud and theft without having substantiating facts. There may be many reasons why the system breaks down. You may not only be doing an injustice to the DX station but you may be exposing yourself to legal action. If the frustration is too much for you to stand, you might consider another hobby. Otherwise accept it as part of the big picture, and enjoy all other great aspects of your favorite hobby.

DX ADVISORY COMMITTEE (DXAC)

There have been several recent interesting actions by the DXAC. The committee voted to recommend to the ARRL Awards Committee that Abu Ail be deleted from the DXCC Countries List as of March 1991. The application for a new DXCC country for the Temburong District part of

Brunei, V85 was unanimously disapproved because it did not meet the 75 mile separation rule. A report on Operating Ethics, containing criteria for disqualification criteria for DXpeditions, will be submitted to the ARRL Board of Directors.

Several items were pending before the committee, as of the beginning of February. They were: deletion of Mt. Athos, status of Eritrea, and treatment of the Czech Republic and Slovakia.

The DXAC is seeking worldwide input on suggested DXCC rules changes that would discourage abuses in the QSL process. Interested parties may submit examples of poor QSLing practices and suggested changes until 31 August 1993. Any change in the rules must be fair, enforceable, and not place burden on ARRL, the DXCC desk, or the DXing community. Your comments should be sent to ARRL DXAC, 225 Main St., Newington, CT 06111, USA. (tnx DXAC)

HAVE DX NEWS?

I can be reached directly by dropping mail into my APLink MBO, leaving a message in the APLink box of CE3GDN*, sending me a packet message addressed to W2JGR@WB0GDB.MN.U.S.A.N.A, finding me on RTTY, telephoning me at (612) 377 7269, or FAXing me at (612) 374 8161. (If you FAX me, please address it with my full name, as that FAX number serves a number of people.) When these high tech approaches fail, the U.S. Postal Service can find me. When I am not chasing DX, my APLINK listens on 21074 during daylight hours and 14074 at night in the Central Time Zone. Set your chirping to WJGR.

THANKS - Thanks to the following for all your information: AA5AU, AA2DU, G0AZT, I5FLN, KB5GL, KK4WW, N4SO, N0ISL, OH2LU, OM3LU, WA1MPB, WB2CJL, W6PQS, and ZS5S. Without you there would be no column.

See you all next month. For now bye bye from Minnesota, PAX...73

de Jules W2JGR ■

*CE3GDN scans 7037, 7070, 14066, 14068, 14072, 14074, 14078, 21070, 21072, 21074, 21076, 21078, 24915, 28074, and 28135.

RTTY DX Operating Hints

QST QST QST BY THE INTERNATIONAL RTTY DX ASSOCIATION (IRDXA)

This information is provided for operators utilizing the RTTY band.

The frequencies between 14080-14095 and 21080-21095 (MARK) are used extensively for RTTY DX. DXers are often struggling to hear very weak signals which may not be audible at your QTH. Please use extra caution before transmitting to insure that you do not cover a weak DX station.

Rare DX stations are encouraged to work split, transmitting in the 080-084 range and receiving up-band. If you think you have found a vacant frequency, please send a few QRL?'s. If the DX gang is trying to work a weak one, they will let you know.

It's nearly impossible to hear weak signal DX anywhere near a station using burst modes. If you switch to AMTOR, PACTOR, or CLOVER, please remember to slide below 080. We'll do our best to keep the DX above.

Here are a few tips for working RTTY DX pileups:

1. If you hear a rare one working stations you cannot hear, don't call on his frequency. Check up the band for a pileup. He may be working split.
2. Keep your calls short. Long calls slow the rate by overlapping.
3. Never send the DX his call. He won't forget it between QSOs.
4. Never send RY's. Electronic RTTY boxes don't need to synchronize.
5. Never transmit during a QSO. Wait for the QRZ.
6. Never send a DX station your brag list unless he sends his first.

RTTY DX is the last bastion of Gentlemen (OK, Gentlepersons) in ham radio. Please don't spoil it.

This QST is by the International RTTY DX Association. Relayed by W6PQS.



MSOs

Dick Uhrmacher, K0VKH
212 48th St
Rapid City, SD 57702

Hi Gang! This month's "MSO Column" is a continuation of last month's article, which hopefully will provide a bit of information on utilizing personal computers (PC's) in the Ham Shack. Quite basic in nature, this information is written with the new PC user in mind, rather than a tutorial on computers.

1. RS-232 Ports:

One of the nice things about computers is their expendability. With a little forethought, you can order your new shiny computer with all of the RS-232 ports you need. Most new PC's come with two RS-232 serial ports installed, one port having the standard DB-25 connector, (25 pins), and one with a

DB-9 connector, (9 pins). Even though the DB-9 connector obviously contains far fewer pin connections, these ports do have all of the necessary signals to support most all external devices you will want to connect to them.

Are you going to need more than two RS-232 ports? Well, some folks will, and some folks won't! Many of us digital types like to hang all kinds of external devices on our PC's, and unless you're willing to "plug and unplug" quite often, it's easy to run out of serial ports. For example, you may want to have a Packet TNC connected to your computer, while at the same time have a Mouse or Track-ball, and a external phone modem connected. If you're limited to two serial ports,

you can see that something has to be plugged or unplugged at some point in your operation.

The solution is to order a second I/O (input/output) card for your computer. They are relatively inexpensive, being in the \$25 to \$35 range, and usually have two additional serial ports, and one additional parallel port. Having the additional serial ports sure beats having to switch equipment around, as you never seem to have the right device on line. Someone told me recently that he was going to pay \$175.00 for a used I/O device. That must have really been gold plated!

Don't be concerned about whether your external device has a DB-25 or DB-9 connector. Radio Shack (and a host of other folks), sell devices known as "gender changers", which come in a variety of choices. Male to female, female to male, 25 to 9 pin, and 9 pin to 25 pin, etc. Take a look at your external device, compare it to your computer I/O, determine what your cable requirements are, and visit your computer retailer. Most of the time they'll have just what you need.

Finally, there are "data switches" available which will allow you to switch a serial port between two external devices. They work well, but are obviously limited in value, as the two external devices you want to use simultaneously will of course be the two that are hooked to the data switch, and you will only be able to use one device at a time.

2. Parallel Printer Ports.

Well, there's not a lot to say about parallel printer ports, except that most computers sold these days come standard with a "Centronics compatible" parallel printer port. Most all printers have a "Centronics compatible" interface, so it's just a matter of running a cable from the computer parallel port, to the printer, and you're in business.

Some folks have more than one printer. For example, a dot matrix printer for every-day use, and a laser printer for desktop publishing, graphics, etc. There are two approaches that can be used to support two different printers, and the first is to have a second I/O card installed in your computer. Not only does that provide a second parallel port, but it will also have two additional serial ports, which can be connected to all kinds of goodies. The obvious advantage to this approach is that switching between printers is done in software, rather than by manual switch, cable switching, etc.

The second approach, and most likely just as expensive as the second I/O card approach, is to have a parallel printer "data switch". As with serial ports, this allows the user to manually switch between two printers.

3. Video Display Terminals (VDT's).

There are as many options in VDT's, as there are lakes in Minnesota! Personal preferences play the biggest part in deciding which VDT will satisfy your needs. For example, there are monochrome monitors, (yellow phosphor, green phosphor, white on black, etc); there are EGA color monitors, VGA, Super VGA, XVGA, interlaced, non-interlaced, etc., ad nauseam!

If I were to recommend a VDT for a business, recreational hobby, etc., then I would say you should purchase the "latest and fastest" VDT available. Software developers strive to present eye-catching color, fancy graphics, etc., and having a fast, sharp color VDT is great for exploiting these features.

However, there is an important consideration when thinking about placing a color monitor in the ham shack. Receiver (transceiver) manufacturers strive for front-end performance at or near the one-quarter microvolt level. We all want to be able to dig out that DX-pedition using 25 watts to a dipole antenna, and good receiver performance is essential. However, when you place one of the XVGA 1280 x 1240 resolution color monitors in close proximity to a hot receiver front-end, there's the distinct possibility that you're going to have radio frequency interference (RFI). It won't happen every time, with every color monitor, but the possibility of it happening is much greater with the faster, higher resolution color monitors, than it is with a monochrome monitor.

There's really no substitute for testing in this case. If your friendly computer salesperson will allow you to try a color monitor in the ham shack, then you will have the opportunity to look for RFI that is monitor caused. If you are purchasing a computer via mail order, then as the fellow once said, "you pay your nickel, and you take your chance". There have been advances made in color monitor design that have suppressed a lot of the hash and noise that are inherent to fast, colorful monitors. The same is true of CPU and computer motherboard design. Many of the newer computers and monitors coexist very nicely with ham transceivers, and although most all of them do present some RFI on some frequencies, it's a livable situation. But, it is better to be forewarned about RFI possibilities, and understand that "fast" in computers equals "more noise", than it is to not understand these problems. If at all possible, test the computer/monitor in the ham shack so you understand what the problems are before making an irrevocable decision.

4. Computer Telephone Modems:

Every time you dig out your credit card at the gas station, restaurant, Sears, etc., a phone modem is used to check your outstanding balance, whether you've paid your credit card charges promptly, whether the card is stolen, lost, etc. Having a phone modem in your computer is something that I feel is an almost essential item. It does extend the cost of purchasing a new computer a bit, but the usefulness and flexibility of having a phone modem is undeniable.

For example, many electronic manufacturers, (several in the ham radio area that I know of), are now designing products where the operating program is mostly in software, (rather than being in firmware). The very obvious advantage to this approach is that changes to the existing operating program can be made by simply replacing the operating program software on your hard drive, rather than having to open up the computer, remove the appropriate card, find the right ROM on the card, and replacing it. And this is where a good, high-speed phone modem comes into play. These same manufacturers now maintain a Bulletin Board System (BBS), which contains the latest in their software upgrades.

As an example, the HAL Communications Corporation, Urbana, IL, recently announced their PCI-4000 "PC-CLOVER" system. As with any new developing system, (especially in ham radio, where everyone and their brother has something they would like to see in a system), changes have been made in the operating software. Unlike systems in the past, where changes had to be written to ROM, shipped to the end-user, and installed on the appropriate card in the computer, the "PC-CLOVER" software is entered in the HAL Communications BBS, where it can be downloaded by anyone. It's simply a matter of logging onto the HAL BBS, downloading the appropriate software, and installing it on your hard drive. Voila!! Instant software upgrade.

There are so many other uses for a good phone modem that the list is only limited by ones imagination. Access to local phone line BBS's; ac-

cess to literally thousands of other BBS's, some long distance charges, and others with 1-800 toll free numbers; access to WWV time/data information; updating of products via manufacturers information or software; swapping of freeware or shareware software with friends or acquaintances; access to CompuServe, Prodigy, etc., networks, and many other items.

Prices on the higher speed modems have fallen markedly over the past year. I would encourage new computer owners to purchase 9600 baud modems as a minimum, and if their budget provides, the higher 14,400 baud modems with V.32 and V.42bis protocols are truly amazing in the speed department. The difference between 250 to 350 bps at 2400 baud, and 1500 to 1600 bps at 14,400 baud makes quite a difference in your long distance phone bill in dollars saved.

In summation, don't let the "computer revolution" scare you. Let's face it, computers are here to stay, and one only has to pick up a copy of QST to see the tremendous impact they are having on Ham Radio. With a little advance planning you'll find a computer in the shack a great asset, and after you've used it for a while, and have become comfortable with the various commands used to operate it, you'll wonder how you ever got along without it.

MSO RAMBLINGS:

If you're looking for the ARRL Bulletins, DX information, or a place to leave a note for a friend, the K5FL MSO, Denton, Texas, has it all. Brownie, K5FL, maintains a super MSO, and encourages anyone to utilize his system. He's parked on the "National Autostart Frequency", 14 085 625 Hz, (Mark), 74 baud. --- Welcome back to Dennis, WA8ZRK, MSO Sysop in Dearborn, MI. Dennis had a bit of equipment problems, but has those conquered now, and his MSO is providing fine service.

That's it for this month Gang. Can Spring be far off? Being that I'm the proud owner of a new fishing boat, I'm ready for the ice to go out! 73, and have fun on the digital bands!

de Dick, K0VKH ■



THE LINK

Jim Jennings, KE5HE
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Hearne, TX 77859

There are times when I write this column that I worry about having enough to talk about and this month I have so much that I don't know where to start. Our illustrious leader, Dale (W6IWO), has asked that we address some of the things newcomers to digital radio could use to help them get up to speed a little more easily. At the same time, there are the current events concerning rule making proposals being made by the ARRL and their impact on the digital community as a whole. So this month I will do a tutorial on tuning the HF digital modes.

Background

Probably one of the first questions a newcomer or even an "old comer" might ask when discussing digital modes is how did we ever get these apparently unusual frequencies for tones etc. that we use on the digital modes. We use 2125 Hz audio tone for the FSK "Mark" frequency and 2295 Hz for the FSK "Space" frequency. The difference between the two is 170 Hz which is called the "Shift". It turns out that in the early days commercial terminal units generated all their tones from a single stable oscillator operating at 85 Hz. All of the tones associated with these standards are harmonics of 85 Hz so they could be relatively easily and precisely generated in the terminal unit.

Early RTTY systems used 2125 Hz and 2975 Hz tones or wide (850 Hz) shift. These tones were difficult to fit into the narrow pass band of SSB receivers so the Europeans went to what is called low tones (1275 Hz and 2125 Hz). Notice the retention of the 85 Hz harmonics. When narrow shift (170 Hz) started to be used, the European stations stayed with their 1275 Hz mark frequency and adopted the 1445 Hz for space. For a while 425 Hz was fairly popular and I can remem-

ber building audio filters for those tones (actually I just padded down the Space tone filter with capacitors to reduce it to 2550 Hz). That way I could switch between 850 and 425 Hz shift fairly easily. All amateurs now use narrow shift as the standard, although the Europeans use different tones. It turns out that if you have a contact with a European who is using low tones you will never know the difference because you will just have a slightly different dial setting than he. Narrow (170 Hz) shift using the 2125/2295 Hz pair is now considered the standard among the RTTY and AMTOR community. The center frequency of this audio tone pair is 2210 Hz.

With the advent of packet things changed a little. Early packet modems used hardware developed by AT&T. That standard is the Bell 103/113 modem. The tones from the Bell 103 modem that were used initially were the 2025/2225 Hz pair. This of course is a 200 Hz shift. The AEA PK-232 uses the 2110/2310 Hz pair on HF. Apparently this pair was selected because it gave the same center frequency as the RTTY narrow shift standard. The PK-232 normally uses the same tones on AMTOR as on Packet when in AFSK mode. (When you are in FSK on the PK-232 you will transmit with whatever shift your transmitter is set for.) One who is using standard RTTY/AMTOR equipment will normally work someone using a PK-232 by "straddle" tuning. That is you adjust your frequency so that the center frequencies coincide.

Some Definitions

Refer to Figures 1 and 2 during the following discussion describing the various terms that are used on this subject. Figure 1 shows a typical FSK signal within the occupied channel. I was reminded by Ralph, W3GL, sev-

eral days ago of a helpful aid, LSMFT. That was a commercial slogan years ago that some of us are old enough to remember. Here it means "Low Space Means Fine Teleprinting". While the mark frequency is the lowest audio tone, the space tone is represented by the lowest RF frequency.

The concept of occupied channel and center frequency is used by the Commercial and Military users throughout the world as the standard way of prescribing the frequency of RF communications. The reason for bringing this subject up is that apparently we will have some digital operation in sub bands on HF in the future in the Amateur Service. Though some will argue the point, let us assume that all of the digital modes currently being used by amateurs on HF, with the exception of Packet but including CLOVER, can operate within a 500 Hz bandwidth. Packet needs about 1500 Hz bandwidth. It is obvious that we can get the maximum utilization of the sub bands if we divide them up into 500 Hz channels. Each Packet transmission just occupies 3 channels.

In order to provide the minimum interference outside the channel, the center frequency of each mode should be in the middle of the channel (250 Hz up from the bottom). That being the case, the mark frequency is above the center frequency by 1/2 the shift. The center frequency is the average of the mark and space frequencies. One of the confusing things to some people is that the term mark frequency is used to describe both the radio frequency of the transmitted mark and also the audio frequency of the mark tone used in the controller. In both Figures 1 and 2 all of the terms are radio frequencies.

How Do You Set Your Dial?

Let us say that your buddy, AF5K, is running a PK-232 using AFSK (200 Hz shift) and says he would like to

meet you on 14,073.00 KHz (LSB dial frequency) on AMTOR. You are also running a PK-232, but use FSK with 170 Hz shift on a Kenwood TS-450S. (That radio and most others read mark frequency on the dial when in RTTY or FSK mode). What frequency do you set on your radio? AF5K would have his center frequency on

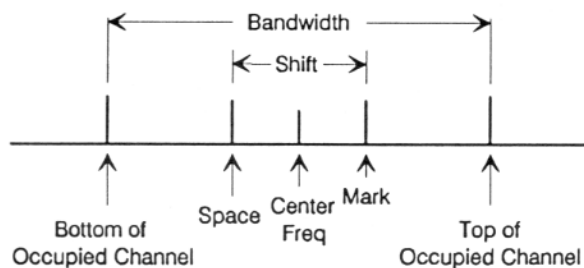


Figure 1

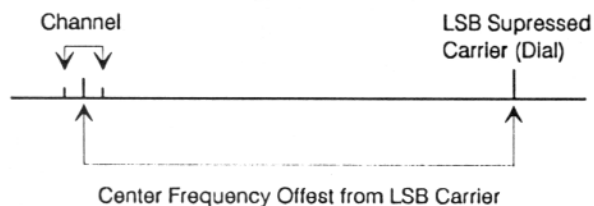


Figure 2

14,070.79 KHz (his space would be on 14,070.69 KHz and his mark on 14,070.89 KHz). The center frequency offset is equal to the average of the mark and space audio tone frequencies.

Having done those simple calculations now, you set your dial so that your transmissions have the same center frequency and give him a call. Since your shift is 170 Hz, your mark frequency is 85 Hz above the prescribed center frequency or 14,070.875 KHz. You set that frequency on your dial and give him a call. Notice that when you do that your mark is 15 Hz below his and your space is 15 Hz above his, i.e. you are properly straddle tuned. Obviously this is a theoretical example as your radio will only readout to the nearest 10 Hz and you have to round off the dial reading. It is not uncommon for APLink stations to be within 3 Hz of their published mark frequency so learning how to tune closely can be important.

If we reverse the situation and you tell AF5K to meet you on 14,073 KHz mark, then what is his dial reading to work you? He has to set his dial at 14,075.125 KHz (2.125 KHz above your mark). Since you are running 170 Hz shift your center frequency is 85 Hz below your dial or 14,072.915 KHz. He has to add his center frequency offset (2.210 KHz) to get his dial reading (14,075.125 KHz).

In summarizing what I have said above I offer the following rules (although the above discussion and the figures should help you to understand what is going on if it has been a problem):

1. If you are both using the same mode (FSK or AFSK) and the same shift, you set your dials to the same reading.
2. If you are using FSK and the other station is using AFSK (LSB), you tune 1/2 half your shift (normally 85 Hz) above his center frequency. (His center frequency is normally 2.210 KHz below his dial frequency).

This would normally be 2.125 KHz below his dial reading.

3. If you are using AFSK (LSB) and the other station is using FSK, you tune 2.210 KHz above his center frequency. (His center frequency is 1/2 his shift (normally 85 Hz) below his mark frequency). This would normally be 2.125 KHz above his dial reading.

4. On any of the "narrow" modes (AMTOR and RTTY), the edges of your occupied channel are 250 Hz above and below your center frequency.

What About Packet, PACTOR, and CLOVER?

The center frequency of both the Packet and PACTOR tones is normally 2210 Hz. The shift for each of those modes is 200 Hz. The center frequency of CLOVER using their Voice Channel 4 is 2250 Hz. Since CLOVER is not an FSK mode, the term shift has no meaning. Clover

uses 4 tones, each tone is on for 32 milliseconds, the second tone comes on 8 milliseconds after the first and so on. The amplitude of each of the tones ramps up to a peak 16 milliseconds after it comes on and goes back to zero at the end of the 32 millisecond interval. You can think of the modulation as a "repeated rippling" through the 4 tones. Of course any of the tones may be either on or off during the 32 millisecond period. The tones for CLOVER are 2062.5, 2187.5, 2312.5, and 2437.5 Hz.

Summary

In order to be the most efficient in using our bands we should then space "channels" using the digital modes at 500 Hz intervals. For a sub-band, the center frequency of the first channel would be 250 Hz up from the bottom edge of the sub band and the center frequency of the last channel would be 250 Hz below the top edge of the sub band. If we specify center frequencies for these channels, those using mark frequency would just tune up 85 Hz from the center, those using AFSK (AMTOR, Packet, or PACTOR) would tune up 2.210 KHz from the center frequency, and those using CLOVER (AFSK) would tune up 2.250 KHz from the center. In that way all three modes can fit in the same channel and make the most efficient use of the sub-band. All of this really makes more sense when we are talking about the spacing of MBO's and BBS's within the proposed sub-bands. With only a 5 KHz sub-band on 40 meters for all APLink, CLOVER, PACTOR, and Packet MBO's and BBS's, it is going to be a crowded situation at best.

73 and GOD BLESS de Jim, KE5HE at KE5HE.#CENTEX.TX.USA.NOAM

DAYTON 93

HOTEL ROOMS

At present all rooms have been taken. I also have a standby list for those who would like a room. I do not think that I will be able to obtain any more rooms. So if you are planning a trip to the Dayton Hamvention, I advise you to secure a room as soon as possible. I will add you to the standby list if you desire but that is no guaranty of a room. I can only re-assign rooms where someone has canceled.

FRONT COVER

Mario, IK1HXN and Gilberto, IK1HSR, made an excellent effort in the 1992 CQ/RJ WW RTTY Contest. Their score in the Multi-Op Single effort was 297,750 with 518 QSOs. Gilberto is a new subscriber to the RJ and I'm sure we will be hearing more from him and Mario in future contests. Good Luck to you both and thanks for sharing this nice photo of yourselves and the contest station of IK1HXN.

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The RTTY Journal Contester's Guide contains 40 pages of rules, log forms, and Dupe sheets for all the current world-wide RTTY/AMTOR contests. If you enjoy contesting, you will find this guide an invaluable asset to your shack. No longer will you need to sent away for forms or rules, they are all included. Even the latest Japanese RTTY contest is covered in the guide. If you are new to RTTY contesting, the guide also includes an introduction to digital contesting written by famous contester, Hal Blagen, WA7EGA. ORDER TODAY! The guide is \$9.50 plus \$3.50 S/H. Order direct from the RTTY Journal. See page 2 for address. Sorry no credit cards accepted.

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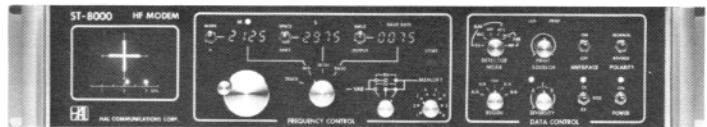
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