DIGITAL Journal

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DJ1IJ at his operating position.
More on the International Scene on page 9

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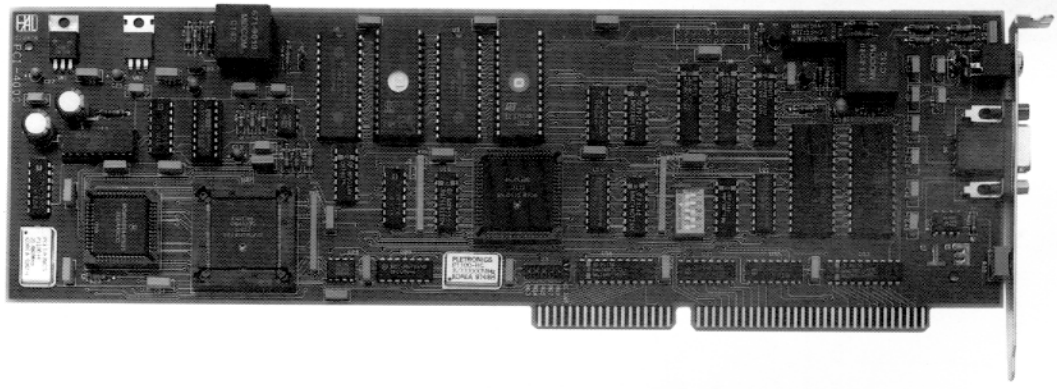

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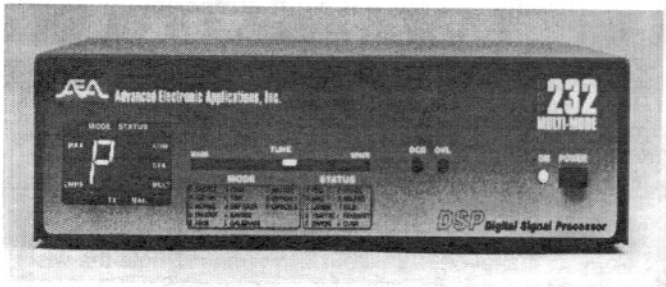
Packet Power

Tips for the new and seasoned packet user

by Dave Wolf, WO5H

P.O. Box 189 • Burleston, TX 76037-0189 • CIS: 73427,2246



AEA Announces New Multi-Mode Controller

Just when you think that the bloom is off the rose in the packet world, you get word of something really exciting! I received an innocent-looking envelope from AEA last week that has me checking the budget and making space in the shack. I can hear an echo of my ex-wife's voice "don't you already have eight of those already?!" AEA has announced, at long last, an upgraded version of the famous PK-232 multimode TNC.

What makes this unit new, dubbed the DSP-232, is given away in its model number. It uses DSP, or digital signal processing. DSP is computer-controlled filtering. Instead of fixed filtering that may be a compromise in performance for several modes, DSP allows dynamic filtering. A computer program determines the personality of the modem the TNC presents to incoming signals. There are 17 modem configurations in all, making the DSP-232 good for PACTOR, AMTOR, RTTY, CW, HF packet, 1200 and 9600 bps VHF packet and two BPSK satellite modems!

What seems to set this unit apart from many of the DSP projects currently in the marketplace, was AEA's choice of the 32-bit Motorola 68340 processor and Analog Devices' 2105 DSP. This is a significant jump in performance over the 8-bit-based processors found in many DSP units. This permits the unit to handle the relatively new 'PACTOR II' and future coding schemes, as they are developed. Speed and detail, this is what 32-bit processing gets you.

In addition to the usual mail box and Signal Identification and Acquisition Mode (SIAM), there is a Gateway mode and firmware for GPS so you can have fun with APRS locating software. All this and more for only $495 list. Of course, expect the street price to be a bit cheaper. Some may say this is a lot of money for a little box, but it packs a lot of features in there. This little number will certainly grab the attention of the commercial marine ops. To do all that the DSP-232 does in the commercial market would set you back at least $5000!

Why Are We Stuck at 1200 Baud?

Good question. With more transceivers being produced that are 9600 baud-ready, and the cost of 9600 baud TNCs under $200, you'd think that more folks would start jumping on the high-speed bandwagon. Sorry to report that it's just not happening. I have an idea why. It has to do with the expense of setting up and maintaining 9600 baud networks to make all of the BBS and chit-chat activity possible. In a few limited areas about the country, there are high-speed networks set up and a few folks are enjoying the pleasure of operating with almost-telephone modem speed performance. There have been more networks that were set up and then abandoned, I'm sad to report. It makes most sense to build backbones and nodes with used commercial equipment. These radios are cheaper, initially, and more rugged than typical consumer equipment. Unfortunately, these radios were not designed for 9600 baud operation, and must be modified. These radios also require regular maintenance, such as spotting on frequency. Some of you 'old timers' will remember the routine every few months, of taking your two-meter rig to the local radio emporium to net all your crystals back on frequency. The same is needed for these commercial radios, and then some. 1200 baud AFSK can tolerate lots of "slop." 9600 baud FSK is not nearly as forgiving. If all is not nearly perfect, you don't have a connection.

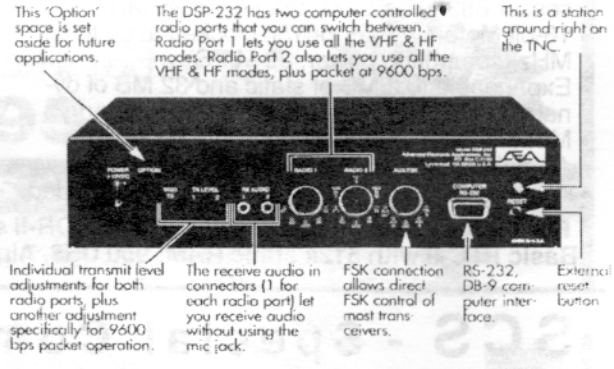
What can be done to promote more high speed packet? Mods have to be developed for the favorite commercial rigs to stay tighter on frequency with less maintenance. These mods must be published far and wide so that those using simple test equipment can reproduce them. New mindsets must also be developed to encourage high speed development. The old method of sticking a digipeater on the highest stick in the area and having a BBS or two, DX Cluster and ROSE switch set up shop on the same frequency has got to end. Repeaters (yes, digital repeaters!) dedicated for each special purpose (BBS on one channel, DX Cluster on a separate channel, etc.) must be set up. Throughput on repeaters is miraculous, because you no longer have collisions.

Yes, this takes money, honey. As you kick off the new year, think about what a group of 20 hams kicking in $50 apiece can do to purchase decent used commercial gear, make several dedicated repeaters for their community and then all really having some fun with packet that operates much faster than at a snail's pace! Stranger things have happened.

Keep those cards and letters rolling in to PO Box 189, Burleson, Texas 76097.

Until next time, keep using your Packet Power.

73 de Dave Wolf WO5H



Digital Signal Processing

The first in a series of articles exploring the wonders of DSP

by Doug Hall, KF4KL
4400 Duraleigh Road • Raleigh, NC 27612

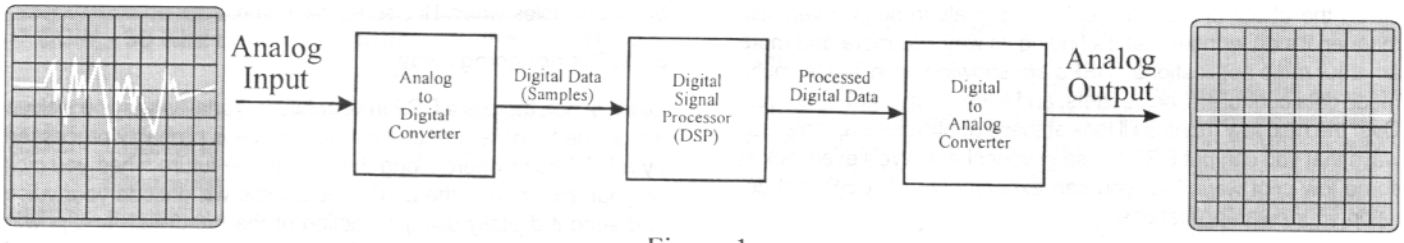


Figure 1
DSP System Block Diagram

If you read any of the ham magazines then you've certainly noticed that the term "DSP" is appearing with increasing frequency in ads and articles. DSP (Digital Signal Processing) is one of the most exciting things to happen to amateur radio in a long time, but many amateurs are still in the dark about what DSP is and what benefits it brings to their hobby. In this article I'll give an overview of what DSP is and why it's finding its way into so many amateur radio applications. In future articles I'll discuss some of these applications and describe ways that you can put DSP to work in your shack.

What is DSP?

Digital Signal Processing, or DSP, is the use of a computer to manipulate digital signals in order to extract information from them or make them more useful in some way. The computer that performs this function is called a Digital Signal Processor, or DSP. So "DSP" can mean either the process or the processor; usually the context makes it clear what we're talking about. And what is the difference between a digital signal which the DSP operates on and an analog signal? Analog signals are the signals we live with in the real world.

Analog signals have defined (or measured) values at any instant in time. The sounds we listen to and the light from the sights we see are examples of analog signals. Unfortunately computers are not very good at dealing with analog signals. Computers can only work with numbers, so we have to convert analog signals into sequences of numbers before the computer can do anything reasonable with them. A digital signal, then, is one in which numbers are used to represent the value of an analog signal at regular intervals. The idea is that you can take a "snapshot" of the signal every so often and get a good idea of what the signal looks like even though you don't know the value of the signal at all times. This process is called "sampling", and the values taken at regular intervals are called "samples".

You'll often hear the term "sample rate" used when talking about a DSP system, and this is the rate at which the incoming analog signal is sampled. DSP theory dictates that the sample rate in a DSP system has to be at least twice the frequency of the signal of interest if an accurate representation of the signal is to be obtained. If our sample rate is too low then we won't gather enough information. If the sample rate is too high then we're just wasting DSP time that could be spent actually running the DSP program. So the sample rate is usually set at just a little over twice the highest frequency of interest. As an example, compact disc recordings (which must reproduce signals as high as 20 Khz for hi-fi audio applications) are sampled at a 44.1 kHz rate.

Telephone systems (which must only handle the frequencies associated with voice) typically use an 8 kHz sample rate. Many DSP HF modems and DSP noise filters also use a sample rate in the neighborhood of 8 kHz. Figure 1 shows a block diagram of a DSP system. The "snapshots" or samples are taken by running the signal through an Analog-to-Digital (A/D) converter and reading its output with the computer at regular intervals.

The Ultimate Breadboard

Now that we have a digital signal, what can we do with it? This is where DSP really gets interesting. We can apply all sorts of mathematical operations to the digital signal to implement functions that would be much more difficult with normal analog techniques.

Suppose, for example, that we wanted to implement a filter to remove interference from the incoming signal. In an analog system we'd have to build a circuit with op amps and resistors and capacitors and then tweak the values for optimum performance. In our DSP system we can write a short program which implements the equation for a filter and apply it to the digital signal. The results produced by this program would be fed to a Digital-to-Analog (D/A) converter to produce a filtered analog signal. And unike the analog filter circuit, our digital version would be unaffected by changes in component values due to aging or temperature variations.

If we want to change the center frequency or the bandwidth of the DSP filter we only need to change the software. With the analog circuit we'd have to change component values or even add more components to change the filter characteristics. The DSP system gives us versatility and freedom to experiment without starting from scratch each time. And by simply loading new software we could change from our filter application to something completely different, such as detecting and decoding DTMF digits on a repeater system.

The DSP hardware could remain the same; only the software would have to be changed. The following simple DSP software example shows how a DSP system can be used to replace traditional analog circuitry. In this example, written for the Texas Instruments DSP, we see how easy it is to amplify a signal:

```
IN   SAMPLE,A_TO_D    ; read sample from A/D converter
LT   SAMPLE
MPY  GAIN             ; amplify it (multiply by GAIN)
PAC                   ; get product of multiplication
SACL OUTPUT           ; save it
OUT  OUTPUT,D_TO_A    ; convert it back to analog
```

If you've never written software in assembly language this may look like Greek to you, but it's actually very straightforward. In this example we can easily adjust the gain of our DSP "amplifier" by storing different numbers in the variable GAIN. No resistor changes are needed, since the amplifier is built out of software. Of course this is a very simple example, but the beauty of DSP is that we can continue to build and add new "software circuits" simply by writing more software.

Given the ability of DSP to deal with signals in such a versatile manner, it's no wonder that it's finding its way into more and more amateur radio applications. DSPs are showing up in TNCs, multimode data controllers, noise filters, and even the radios themselves. Over the next few months I'll look at these applications and discuss ways that you can put DSP to use in your shack. We'll even look at some low cost ways that you can experiment with DSP and develop your own applications.

Having spent some time telling you what DSP is, let me close by telling you what DSP isn't.

1. DSP is not new

The concept of using computers to perform signal processing has been around for nearly half a century. But for years the cost of a computer fast enough to actually do any useful processing was so high that analog techniques were almost always more cost effective. What's new is that now you can buy DSP chips which can multiply numbers at a rate of 20 million times each second for less than $10 from companies like Texas Instruments, Analog Devices, and Motorola. A decade ago such performance cost tens of thousands of dollars. And because they're so cheap, today's DSPs are finding their way into radios, TVs, modems, cars, computers, telephone answering machines, and even hearing aids.

2. DSP is not magic

DSP is not a magical cure for all of the problems we encounter with signals today. It may be superior to analog solutions in many cases, but it has its own set of limitations. Remember that DSP is based on software, so all the problems associated with developing software (such as finding those pesky bugs) plague the DSP designer as well. Using and understanding DSP doesn't require a degree in computer science, but it does require an understanding of a few basic principles which I'll discuss next time.

3. DSP is not going away

Like it or not, there is a DSP in your future. Today when you pick up the phone to make a phone call your voice is probably processed by a DSP somewhere along the way. In the future when you pick up your microphone the DSP in your radio will encode your voice and send it digitally using a fraction of the bandwidth and power necessary today. Another DSP in the radio at the other end will decode it, removing the interference and delivering crystal clear audio to the operator there.

Today we think of the digital modes as RTTY, AMTOR, Pactor, Clover, etc., but in the future even voice could be a "digital" mode. Even now data is being sent and received over the air by modems using advanced modulation techniques such as Clover or Pactor II which could not have been implemented without the aid of DSPs. DSP is finding its way into the IF stages of our rigs, replacing the expensive crystal filters and generating clean SSB and CW signals. And we're only just seeing the tip of the iceberg. DSP is definitely not a "flash in the pan."

Next time I'll go into a bit more detail about DSP theory and look at some popular amateur radio DSP applications. iMeanwhile I'll leave you with a quiz: What and when was the first DSP product ever advertised in an amateur radio magazine? The answer next month.

Beedle Beedle

A series of digital snippets

by Crawford Mackeand, WA3ZKZ
115 S. Spring Valley Road • Wilmington, DE 19807

One of the things that you find out as you gain experience (which can roughly be translated as an antiquing process) is the more certain knowledge of those things you are not good at. I now know, for example, that I am not good at things graphic. I run my computer in DOS, for the simple reason that I cannot for the life of me remember what all those funny little pictures mean in Windows. (I do wish someone would come out with "Windows for the Graphically-Impaired!") I had a further clue of my incapacity a couple of years ago. I had always had a fairly good ear for language, and when I retired I decided to try to learn Japanese. The first hurdle was the Hiragana syllabary. You can't say alphabet .... its not alphabetic ... each symbol by and large stands for two of our letters. There are fifty-five of them, and that's bad enough. But then, any foreign word, and many things we would capitalize, like headlines and telegrams, by convention use Katakana. The same sounds, but a whole new fifty-five signs. And when you master all of this plus the spoken language, you still can't read. All the senses of the words, the nubs as it were, are written with Kanji, originally from China. A high school kid knows some 10,000 of these and a university graduate has 30,000 or more at his or her fingertips. Noooo way, Jose. Not me. (I did hold out for a whole year!)

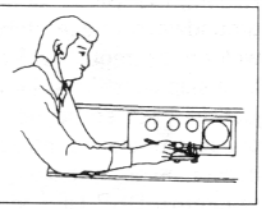
What has all this to do with digital radio? Only this. A good few years back, when I started to learn computer programming (in K-Autocode... anyone heard of it?) the going was not too difficult. Then FORTRAN, and finally BASIC. In learning BASIC, I used a little book from the late lamented Dilithium Press. The author described the process of nailing down software in ones mind as kin to the strange, difficult, but do-able, job of "Nailing Jelly to a Tree". I thereafter found the point at which my abilities in software and in graphics clash. To visualize, and this seems to be the important point, the interaction of events in real time, one apparently needs the ability to think graphically. I have struggled with the real-time aspects of AMTOR, I used to try to understand timing cam diagrams of Teleprinters, and I failed both tests miserably. Come to think of it, I never did find phasor diagrams any help either.

So I guess that the realtime tree just won't take my nails, or I am still, after all these years, holding the hammer at the wrong end, but I do wonder how many out there find they have the same blind spot. Therefore I hereby take my hat off to people who really do relate to timing diagrams and the like, and make digital radio such fun for the rest of us. And for the JA's in this bracket,

Coherent CW

Another Digital Mode

by Peter Lumb, G3IRM
2 Briarwood Ave. • Bury St. Edmunds, Suffolk • UK IP33 3QF



*** CCW - 35 Khz up on all bands - plus/minus 1Khz ***

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G3IRM - Tuesdays at 1900z on 10135 - Thursdays at 1900z on 7035 - Saturdays and Sundays at 1900z on 14035.

VE3OXX -Sundays at 2000z on 7033

W6HDO - Thursdays at 0500z on 7035 and at 1830z on 14035.

W6HDO or WB6RIJ on Saturdays and Sundays at 1900z on 14035.

In my last column I remarked that I had six enquiries as a result of my article in the RSGB's magazine from a membership of, perhaps, 8,000 to 10,000. I see in a recent issue of the magazine that my guess was very much on the low side as the membership is 30,000 and that the manager complains that less than 5% of the membership bother to vote in Council elections!

The following are some notes kindly sent to me by Bill de Carle and relate to the BPSK option available on the latest COHERENT program. I have not heard of anyone trying this mode on the h.f. bands but I understand there is a lot of interest among Lowfer operators.

The COHERENT Program's BPSK mode

The COHERENT software may be used to send and receive Coherent CW (CCW) at the standard 12 wpm (100 msec per dit), with additional speeds of 6 wpm and 4 wpm. To modulate a sinewave carrier we may alter its amplitude, frequency or phase. The COHERENT program can be invoked with an optional "BPSK" command line parameter to use the "Coherent BPSK" mode instead of the more familiar CCW. BPSK stands for Binary-Phase-Shift-Keying. If Morse Code is thought of as amplitude modulation (the carrier is switched on and off) - BPSK corresponds to phase modulation. In this mode bytes are transmitted; each bit occupies one 100 msec time slot, the receiver locking on and tracking gradual timing variations in much the same way as for CCW. For historical reasons, a start bit (always 0) and a stop bit (always 1) are added at the beginning and end of each byte. This makes each byte take ten bit-times (one second at standard speed) to transmit. The least significant data bit is transmitted first and the transmitter operates continuously at full power. When no data is available, idle characters (ASCII NUL's) are sent to fill unused time slots.

Our carrier has two possible phases: 0 and 180 degrees. A 180-degree phase shift is easily accomplished at lower RF frequencies using an exclusive OR gate as a modulator. This inverts the carrier during certain bit-times under control of the computer. In practice differential phase-shift-keying is used. A 1 is encoded as a phase shift, 0 as no phase shift. This eliminates the need for a precise phase reference at the receiver, with only a slight performance penalty. It also ensures there will be at least one phase transition each second regardless of the data being transmitted, helping the software tracking loops.

There is an unlicensed band (in the US and some other countries) at 160..190 Kilohertz, below the standard broadcast band. The experimenters who live there refer to themselves as "lowfers". The FCC rules impose a limit of 1 watt DC input power to the final amplifier as well as a 50-foot limit on the antenna. Although groundwave propagation at these low frequencies is wonderful, getting a signal launched is difficult. With a wavelength of nearly two kilometers the 50-foot antenna limitation is cruel. Lowfers consider themselves lucky if they manage to radiate one thousandth of the allowed 1 watt input power. The band is also very noisy, especially during the summer months when thunderstorms produce horrendous static crashes.

These harsh conditions have encouraged lowfers to wring the best performance from their receivers and to experiment with more sophisticated data coding and transmission techniques. Coherent CW (CCW) was used extensively for a number of years but is now being replaced by C-BPSK. The reason: for the same transmitter power, data rate and noise conditions BPSK has a lower bit error rate than CW. The mode is also more convenient for transmitting data between computers: each character has the full 256 possibilities, whereas Morse code is limited to uppercase letters, numbers and a handful of other symbols. Morse Code is nicer on the ear; a human operator can often guess which character was being sent when some dits get garbled, but a computer gets very upset when bits in an ASCII character are corrupted. BPSK is especially suited to the Lowfer band because LF groundwave signals travel great distances with little attenuation and phase stability over time is excellent. Lowfer Max Carter has written many BPSK articles recently in "The Lowdown" (1) encouraging other experimenters to try this new mode.

Why does it work so well?

First of all, if you are allowed by the FCC to run one watt DC input power, it makes sense not to shut the transmitter off half the time like we do with CCW when the key is up! When the signal is buried in noise a receiver can decide more reliably whether a carrier is in-phase or out-of-phase than if it is present or not. Theoretical investigation (2) has shown that of all binary coding schemes, Coherent BPSK has the lowest probability of bit error under identical SNR conditions. Until recently the BPSK receiving filter required very complex circuitry and accurate frequency standards at each end of the link, but now we can accomplish the same thing in software using DSP techniques.

Many lowfers operate beacons, which send the same short message (the station's ID) over and over. Because of its rigidly controlled format with one message character each second, BPSK enables the receiving computer to pull short repetitive messages up out of the noise by additive reinforcement. You only need to tell the COHERENT software the sending speed and how long a message runs, and the program will statistically build up the bits by combining successive frames until the text can be read correctly. Another advantage is the ability to let an unattended receiver run all night, saving the incoming messages to disk for later reading off-line. At one character per second it takes quite some time to transmit long messages and sitting around for hours writing down morse code characters would be tedious.

Although BPSK is ideal for the LF band with its exceptional groundwave phase stability, it probably would not perform as well on the regular HF amateur bands, especially under night time skip conditions. I have run tests on HF locally and it works just fine, but so far no one has tried the mode for DX. If the phase modulation introduced by the changing ionospheric reflection height was slow enough and could be tracked out by the program's DSP filter receiving algorithm it might be practical. Who'll be the first to try it?

VE2IQ 95.10.05

(1) Lowdown magazine is published monthly by The Longwave Club of America, editor Bill Oliver, 45 Wildflower Road, Levittown PA 19057.

(2) See Communications Systems by Simon Haykin, second edition. Published by John Wiley & Sons. Chapter 10 gives an excellent mathematical treatment of weak signals in noise, and compares the expected bit error rates for many coding techniques.

As you will see from the heading I have extended the operating frequencies by plus/minus 1 Khz around the suggested operating frequencies. With the wider bandwidths available in the PCW program this should not cause any problems in finding stations. You can always switch to a narrower bandwidth once the station has been located. Try to use 35 Khz up if you can as calling frequencies. The reason for the extension is the packet interference over here on 7035. Paul PA0OCD and I have found that if we move up to 7035.5 we can avoid the racket and carry on quite a reasonable contact. We started by trying 40 c.p.m. with marginal success but decided that a move in frequency would be better as it now enables us to use the higher speeds.

I had a letter from Tapani OH2LU, who is well known to readers of the Journal after a contest contact we had on 28 Mhz, asking for information. He now has the PCW program so we may be hearing Finland on CCW.

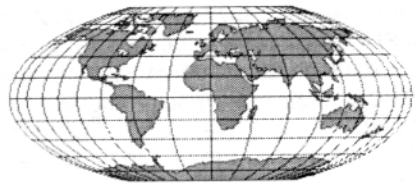
In future I intend to fill any spare space in this column with other items which may interest you. This month it is the story of my new laptop computer. I chose a laptop for three reasons - it fits on the operating table better than a desktop, it does not generate as much interference as a cathode ray display and it has a docking station which accepts two full size cards so I can use CLOVER. I bought the machine in April and within a day or two it started doing funny things. Now I have been using computers long enough to know that these were not as a result of anything I was doing. Sometimes it refused to boot producing nothing but random lines on the screen, sometimes it would not install programs from floppies and sometimes the display flickered similarly to that noticed with fluorescent lighting. Further developments will be reported in future columns.

The International Scene

A regular look at happenings from around the digital globe

Received from various sources

Edited by Jim Mortensen, N2HOS



4UI/4U1/4U1/4U1

Late word confirms that this club station at UN headquarters in Geneva is now up and running with their P38 and Express 3.01. This means that there is a new Clover country on the air for those who so equipped. The equipment for this venture was the gift of both HAL Communications and Euraf of Benin. Though there has been a great deal of conflicting activity keeping club members away from shack, expect to see a flurry of action this winter.

BARTG DUES

GB2ATG weekly news (broadcast in the UK and available from the BARTG web site at <http://cs.nott.ac.uk/~ibx/BARTG/), delivered some bad news this past week.Dues have increased for the first time since 1988 and will take effect on January 1, 1996. Payment from within or without the UK can be made only in pounds sterling.

UK at second class postage	12 pounds
Europe and Eire	16 pounds
Overseas surface	16 pounds
Overseas airmail	22 pounds

SV8/SV8/SV8/SV8

Brand new member Dionysios SV8RV in Zalynthos, Greece wants the world to know about his interest in digital modes. A self described fanatic, he will soon be on the air in Clover as well as all other modes, including all of the digital satellites. He can also be found on the Internet at <zante@athena.compulink.gr). Look for his signal or arrange a contact via E-mail.

G3/G3/G3/G3

Peter G3IRM does more than CCW. He is also on Clover and does most of his calling on 14065.5 (and thinks that Europe should give up on 14066). He adds, "Assuming there are some operators who want to use Clover for DX contacts as well as local nattering, can't we arrange some definite operating times similar to those suggested for CCW. How about two or more operating times a day on 14065.5 and 14066.5. If stations interested in DX called and listened at those times there would be a better chance of contacts and a lot less wasted time calling when nobody is around." Not a bad idea at all, Peter.

DJ1/DJ1/DJ1

Yes there are those seriously interested in chasing countries. Johannes now has 24 (48 users) and will soon no doubt add 4U1ITU (see above), but says Fred DK4ZC now claims 26! He goes on to say, "This is a very busy time in parish life: I had 52 funerals and 32 baptisms this year. But my antenna on top of the church roof since 24 years is busy every day and mostly in Clover. I also love Pactor and now hold 147 countries in that mode. Last was A92.

My picture for Express (a .cmp file) is still in the beginning. My picture was taken by SSTV and saved in Pasokon, then translated from .tga format to .pcx and from there to .tif. So my head is like a banana. The picture enclosed (front cover) shows more of the reality!" *(and surely doesn't look much like a banana to me!-Ed)*

G1/G1/G1

The Editor of DataComm, BARTG's bi-monthly magazine is now on the Internet. Arthur G1XKZ can be reached at <arthur.bard@react.co.uk>. Art expects to rely heavily on E-mail as he collects articles and information for each issue of the magazine, just as we do with the Digital Journal. We couldn't survive without it! Welcome to the Net, Art.

Cc: Dig MB Europe (2-Sep-95)
R:950925/0150z @:WA1URA.IN.USA.NA WinLink Z:46741 #:169925
R:950917/1637z @:WA8DRZ.#NOCAL.CA.USA.NA #:4011

These digital mailbox stations in Europe operate 24 hours a day (unless noted) on the mark carrier (LSB for Clover) frequencies listed.

5B4ABU Greffrey in Cyprus (.CYP.AS)
P 14080.5

5B4AEJ Karl in Cyprus (.CYP.AS)
P 14068

9A0APL CARC. in Zagreb, Croatia (.HRV.EU)
A 14072

CT1BT Teles in Evora, Portugal (.CTEV.PRT.EU)
A 7037 7039 14075.5 14078 21O76.5 28O77.5

DJ0OW Roy in Offfenburg, Germany (.DEU.EU)
AP 14079

DK0BLN in Germany (.DEU.EU)
AP 3581 7040 14078 14081 21081 28075

DK0MHZ Werner (DJ2HZ), Germany (.DEU.EU)
AP 14074.5

DK0MTV Guenter/DJ8CY in Mainz,(.DEU.EU)
A 3581 7038 7039 14071 14072 14075 14078 14081
A 21081 21115 28075 28115

DL0BN DARC Club in Berlin, Germany (.DEU.EU)
AP 3581 14079 21081 28075

DL2FAK Tom in Hanau, Germany (.DEU.EU)
AP 14079

DL6FZ Hein in Germany
AP 3582 3586 7036 7038.6 7041 14069 14078
14080 21081 21084 28082

DL7AMW in Germany (.DEU.EU)
AP 14079 14080 21081 28075

EA4EII Santiago in Madrid, Spain
P 14079

EA8CAP in Canary Islands (.ESP.EU)
AP 3581 7038 10141 14072 14073 14071.4
14082 14083 AP 18107 21082 21083 24928

F5PGP Chris in Lyon, France (.FRHA.FRA.EU)
P 14066 14068 14070 14080 21070
AS (0700-1800z) NA (1800-2030z)

FE1JPY in France
A 14070.8

G3HYH in Leicester, England
A 1828 1841.5 1845

G4DKD in Oxfordshire, England
P 3583.5

GB7EMX Kit in Aberdeen, Scotland (.#75.GBR.EU)

A 3587.5 3588 3588.5 3589 7038 7039 7040 10145 10146
A 14075 14076 14077 14078 21080 21081 28075 28076
GB7PLY Alan in Plymouth, England (.#44.GBR.EU)
AGP 7043.45 (0800-2000z) 3591.45 (2000-2300z)
GB7SCA John in Plymouth, England (.#44.GBR.EU)
AP 3587.5 3588.8 3589 7038 7040 7041 10145 10146
AP 14071 14075 14076 14077 14078 14098 21071 21080 28075
GB7SIG Jim in Blandford, Dorset, England (.#45.GBR.EU)
A 3587.5 3588.5 3589 7038 7039 7040 10145 10146
A 14076 14077 14078 18105.5 21080 21081 28075
P 14068 14071 14075 14080 21071 21076
GW3DZJ in Clwyd, Wales, United Kingdom
A 3588
HB9AK Paul/HB9AVK in Meilen (Zurich), Switzerland (.CHE.EU)
P 7041 14071 14098 21071
A 3581 3583 3588 3589 7038 7040 10141 10146
A 14071.5 14072 14075 14078 21080 21085 28075 28080
C 14098
HB9BJJ Roy in Lerchenberg, Switzerland (.CHE.EU)
AP 7033 7042 10141 10143 10147 14076 14085
HB9CGB club station in Basel Switzerland (.CHE.EU)
A 3576 3578 3580 14076 14078 14080 14082
A 21076 21078 21080 21082
HB9CJC Rene in Winterthur, Switzerland (.CHE.EU)
AP 7041
I5FLN Luciano in Florence, Italy (.ITA.EU)
P 14069 14073 21069 21073
(1800-0400z) beam NA (0400-1800z) beam AF
IK0NNT Sergio in Rome, Italy (.ITA.EU)
A 14078
LA0FA Peter in Rasta, Norway (.NOR.EU)
AP 7034
LA5JEA Geir on platform 16/11-S, North Sea (.#NORTHSEA.NOR.EU) AP 1840 3581.5 3587.5 7038 7040 14068 14071 14075 21072.5 21075 21077 24925
LA9OK Geir in Raakvaag, Norway (.NOR.EU)
A 3588 3589 7036 10146
LZ2BE Bob in Razgrad, Bulgaria (.BGR.EU)
AP 3582 7036 7038 10146 14068 14072 14074 14078
OE4XBU Rudi in Eisenstadt, Austria (.AUT.EU)
AP 14067.5 14073 14075 21067.5 21073 21075.5
OE5ERI in Austria (.AUT.EU)
A 3590
OH2BAW Staffan in Esbo (Helsinki), Finland (.FIN.EU)
AP 3581.5 3587 7037 7038 10146 14068 14070 14071 14076
ON6RO Rene in Louveigne, Belgium (.BEL.EU) AP 14065.5 14068.5 14070 14071 14073 14075 21073 21075.5 21076
AP 1037 10146 (22-07z)
OZ2AMT Kristian/OZ6KN near Copenhagen, Denmark (.ISH.SJL.DNK.EU) A 14067.5 14073 21067.5 21073
OZ2DQ Ole in Vejle City, Denmark (.DNK.EU)
A 14067.5 (0600-2200z)
PA0QRS Piet in Krimpen, Netherlands (.#ZH2.NLD.EU)
AP 7034 7037 14065.5 14067 14070 14072 21082 28082
PA0RVR Richard in Papendrecht, Netherlands (.#ZH2.NLD.EU)
AP 14069,5 14070 14071 14072 14073 14074 14075 14076
AP 14077 14078 14079 14080 18101,5 18105
PA0RYS Ger in Uitgeest, Netherlands (.#NH2.NLD.EU)
A 3581 3588 3589
PA3FYV PFYV Frans near Rotterdam (.#ZH2.NLD.EU)
A 7038 (1900-2300) 10145 (0800-1900)
SK7CS Teleskolan in Kalmar, Sweden (.SWE.EU)
A 3582 3589
SL5BO Claes in Enkoping (Stockholm), Sweden (.SWE.EU)
A 14077 (or 14078)
SM4CMG Bo in Fellingsbro, Sweden (.SWE.EU)
A 21077
SM6FMB Sven near Gotenburg, Sweden (.SWE.EU)
AP 3581 3587 3589 7037 7038 10141 10145 10146 14068 14072 14073
AP 14074 14075 14076 18105.5 21073 21074 21076 21080 24915 28075
SM7DLZ Hans in Sweden (.H.SWE.EU)
P 3579 (1700-0800z) 14073 (0800-1700z)
TA3BBS in Turkey
P 14068
U5WF Vladimir in Lvov, Ukraine (.LVV.UKR.EU)
A 14075 (except contests)
UA4LCQ Yuri in Ulyanovsk, Russia (.#ULY.RUS.EU)
A 14075 21075

Please send comments/changes to WA8DRZ.
(Thanks to Craig and Frank WA1URA for this material-Ed.)

Ian G4EAN concludes his look at the 'other side' of the amateur radio spectrum in the UK . . . the commercial aspects of the hobby.

THE MAGAZINES THAT ARE PUBLISHED COMMERCIALLY

Actually, I believe that the UK does rather well for itself in terms of ham radio magazines that are available. There are four major titles though one of those is available only by subscription to the RSGB (the national ham radio society here in the UK, i.e. the UK's equivalent of the ARRL). One other title (Amateur Radio, if I remember correctly) was initially published as a single issue but demand was such that it subsequently launched as a regular magazine. It apparently demonstrated that there was not enough support, either from authors or paying customers, to allow the UK to have five titles.

The first of these four major titles is RADCOM (which is an abbreviation of its full name of Radio Communication but RADCOM IS the name that appears on the cover). This is produced and published by the RSGB and goes to its members. The magazine has a tight constraint on its pages since it has to report RSGB business in addition to the normal ham radio scene.

RADCOM covers most aspects of ham radio operation (including a regular data comms column which appears in alternate issues). Theory and construction are covered and the magazine tries (and usually succeeds) to cater for the ham with an interest in most aspects of ham radio. The listeners have a regular column as do the novice hams. There is a regular column about things technical and another one about EMC (and these are my two favorite regular columns).

Second title is **PRACTICAL WIRELESS**. This was owned by a large national publisher but was sold to a team of enthusiasts well able to produce magazines. Like RADCOM, it aims to reach the ham who is interested in the whole spectrum of ham radio. It regularly runs "themed" issues, typical themes being data comms, computers and QRP operation, and such issues will have a collection of articles covering those specific themes. This magazine is nearly as popular as RADCOM which, given that it sells mostly over the counter in newsagents rather than to subscribers, is testimony to its popularity.

Third title is **SHORT WAVE MAGAZINE**. This is owned by the people who own PRACTICAL WIRELESS and caters specifically for the listener. (It used to cater for the transmitting ham but now it is a listener's magazine.) In the UK, the listener has

some justification to feel a second-class part of the ham radio scene (because the assumption is usually made that anyone in to ham radio has a transmitting license) so SHORT WAVE MAGAZINE is much appreciated and very popular. Indeed, I shall now add that it also caters to the viewer because its columns cover SSTV, FSTV and Fax. It also cover commercial satellites, LF maritime beacons and other topics outside of the usual range of ham radio topics.

The fourth and final title is **HAM RADIO TODAY**. This one doesn't quite have the range of coverage that is to be found in the other magazines but does have a very strong emphasis on the spirit of ham radio and the need to encourage youngsters to try the hobby (due, no doubt, to the fact that the editor and her husband have several children of just the right age for ham radio). Yes - the editor is a lady and her editorials contain some very thought provoking and sensible points. Her husband is also licensed and is the technical editor for the magazine.

I can say that all of these magazines are run with ham radio very much to the fore. They all operate in a commercial world so cost and profit have to be taken into account but they all manage to put ham radio before money. I have had many pleasant chats with the editors of all of these magazines and I am happy and willing to say that they are all a fine bunch of people.

RADCOM magazine can be contacted:
by post to
RSGB,
Lambda House,
Cranborne Road,
Potters Bar,
Herts,
England
EN6 3JE
or by phone to +44 1707 659015
or on the Web at URL http://www.rsgb.org/rsgb/

PRACTICAL WIRELESS and SHORT WAVE MAGAZINE can be contacted:
by post to
Practical Wireless / Short Wave Magazine,
Arrowsmith Court,
Station Approach,
Broadstone,
Dorset,
England,
BH18 8PW
or by phone at +44 1202 659950
or by email to
(for PRACTICAL WIRELESS) rob@pwpub.demon.co.uk
(for SHORT WAVE MAGAZINE) dick@pwpub.demon.co.uk

HAM RADIO TODAY can be contacted:
by post to
The Editor (or Subscriptions),
Ham Radio Today,
Nexus Special Interests Ltd,
Nexus House, Boundary Way,
Hemel Hempstead, Herts, England, HP2 7ST
or by email to chris@radshack.demon.co.uk

THE RALLY SCENE

So, onto the final topic in my brief look at ham radio in the UK - the ham rally scene. These, like the ham store, used not to be many in number but this has changed most dramatically over the last decade or so. These rallies are usually held on Sundays and, in 1995, most Sundays would have had at least two rallies (and sometimes up to four) competing for customers. The UK is reasonably compact area and traveling 50 or 150 a rally is by no means unusual. I have two rallies within easy cycling distance of my QTH and several more within an hour's drive.

Some rallies are large events held in real exhibition halls (and the BARTG rally is one such rally) whereas other rallies are small events held in a school hall or, worse, school rooms all off a very narrow and crowded corridors. Some rallies are run by commercial companies which make a living by organizing such events. Other rallies are run by clubs (such as BARTG) for the benefit of the club funds

Some rallies (and the BARTG rally is definitely one of these) cater expressly to the ham - all the stands carry either ham radio or related items. Other rallies cater to the whole family and have stands selling knitwear, toys, ornaments and perhaps also outdoor events such as bouncy castles, display bands and helicopter rides. Some hams prefer the "ham only" rallies whereas others like rallies in which the whole family (i.e. including the family members to whom ham radio is a bore) can participate.

The traders who have stands at these rallies are a very mixed bunch. Some are well known companies which have stores and workshops, others are small businesses where the store and workshop are in one and the same room. Some traders might not be "real" companies but instead simply be hams running a business in their spare time. Finally, of course, a very few are the "once seen, never found again" type of operation where they trade for a very short time then close down (and perhaps open up under a new name with new stock). This last type of trader may typically be found selling "surplus" or "reject" stock. Buyer beware. The UK law requires all traders to display prominently their company name and address but this is usually honored only by the reputable traders; the disreputable traders ignore this law for obvious reasons.

That, very briefly, is the commercial side of ham radio in the UK. Times are not conducive to commercial ham radio at present and so some retailers are closing stores or trying to sell products not quite ham radio related, such as washing machines, fridges and suchlike. The magazines seem to have a stable circulation for each of them. DTP makes it easy to launch new titles but this seems not to be happening in the ham radio world (but you should see the jazz, classical music and photographic magazine shelves!). Rallies are mostly surviving though some are falling by the wayside. Ham radio has seen the boom years of the 1980s and early 1990s and, as with anything else, after the boom comes the fall.

(Thanks to Ian for a thorough look at the 'other side' of the fence. From the sound of it, the commercial folks everywhere (with a few notable exceptions) are having some tough sledding at this point—Ed.)

TY/TY/TY/TY

Peter's QTH was invaded by an army of CW operators for the WW contest. (They claim to have won). He promises to do an article with photos in a future issue. But his E-mail comment was interesting. "It's Monday morning and the CW group is still deep asleep after 48 hours of serious contesting. Most amazing thing about their operation was the total silence in the radio room. The only thing heard was the click of the keys. I make a lot more noise myself on RTTY as I always keep the speaker wide open. It just feels better that way." Don't we all do that?

F5/F5/F5/F5

Paul F5QE is one of our newest members. Welcome, Paul, and yes we do hope to link with you soon on Clover. He is anxious to put his Clover/Express combination to work very shortly so will look for QSO's on any digital mode.

DX NEWS

RTTY DX in the Early '90's

by Don Hill, AA5AU
P.O. Box 625, Belle Chasse, LA 70037 • e-mail: aa5au@aol.com

Happy New Year! I trust everyone had an enjoyable DX holiday season. This month I wanted to review some of those countries in Eastern and Central Europe that came about a few years ago. Well, it didn't quite work out that way, as you will see. This was a clever suggestion from our esteemed editor, Jim N2HOS. I received his e-mail on Thanksgiving Day. It had been a very good day for me. I had awakened early enough to catch my father for a pre-dawn sked on 40m SSB and then cooked two teal and a pintail for Thanksgiving dinner. I had shot them the previous weekend. Duck hunting is a lot like DX'ing. But that is another story. I worked an all time new country on cw, 8Q7VJ on 40 meters in the late afternoon. Man, that was rare! It was number 306 worked for me on that mode. Not much was happening on the RTTY bands so I decided to run over to the riverboat casino just down the bayou, where I hit $160 in less than five minutes. Man, that is even rarer! I didn't know what I had hit on that slot machine, but I knew it was good. At times DX is like that. Sometimes you work something you know is good, but you're just not sure what it is. Such could be the case of the new countries formed in the early part of this decade.

As I researched what happened with the breakups of Yugoslavia, Czechoslovakia, and the Soviet Union, I soon realized that to fully bring the situation into perspective for the readers, I needed to show a chronological order of events. To do this, I looked back into my logbook and rediscovered the tremendous activity that occurred in the first years of the decade, especially on RTTY. It was almost like being there again, looking at all those contacts and notes I had. Once I got started, I almost couldn't stop. The early 1990's brought several changes in the DXCC Countries list. Along with these changes came the sudden rise in the popularity of RTTY as a DX'ing mode. So here is a whirlwind tour of the first four years of the 1990's.

1990: A Good Start

Starting in January with 3Y5X from Bouvet and ending with HK0TU from Malpelo, 1990 started the decade off with a bang. (I failed to bag either one of these on RTTY, and they haven't been on since). In between these two DXpedition the following DX stations were active on RTTY: 1S0XV (Spratly I.), VP8BFH (Falklands), TT8GA (Chad), 8Q7DN (Maldives), JY9SR (Jordan), A15AC (Abu Ail), YV0AA (Aves I.), AH3C/KH5J (Jarvis), VQ9RB (Chagos), J28TY (Djibouti), JH1QDB/JD1 (Ogasawara I.), VS6AK (Hong Kong), and 9L1US (Sierra Leone). Several of the then USSR countries were also available: UA1OT and 4K2OIL (Franz Josef Land), UC1AWW (Belarus), LY2WW (Lithuania), UO5OQ (Moldova), UH9E/UZ9CWA and RH7E (Turkoman), UQ0A (Latvia), and UG7GWG (Armenia), as well as several stations in European and Asiatic Russia.

In 1990, we did lose a couple of countries. North and South Yemen became deleted DXCC countries in favor of one Yemen (7O). As the Berlin Wall fell, so did the DXCC status of East Germany, moving it to the deleted list effective October 3.

1991: Yugoslavia Spins Off Four New Ones

The breakup of Yugoslavia ultimately gave us four new countries in 1991. We didn't know they would become new ones at the time and did not actually get added to the DXCC list until 1993. Contacts with stations in Croatia (9A) and Slovenia (S5) were good effective on June 26. Contacts with Macedonia (Z3) were good as of September 8, and with Bosnia-Herzegovina (T9) on October 15, 1991. Yugoslavia became known as Serbia (YT-YU,YZ), but did not become a new DXCC country.

As war raged over the Balkans, Amateur Radio came to a standstill in those countries in 1991. Despite their new country status, it wouldn't be until mid-1992 that ham radio activity would start up again in earnest in that region of the world. While we watched and waited to see what would happen in Yugoslavia, more and more rare ones showed up on RTTY. VR6WH started out the year from Pitcairn I. UL7LR came on from Kazakh Republic. 9Q5TE showed up from Zaire. Rare CQ Zone 19 station, UW0FZ, was worked from almost anywhere in the world on 10 meters! Dave, N5FTR, operated as P29BT from Papua-New Guinea. Greenland was activated by OX3EW. D68TS was a new one for many from Comoros I. Seghir, 7X2DS, became a regular on RTTY from Algeria. Abu Ail I. (A15) becomes a deleted DXCC country at the end of March.

A station signing FB8WZ, claiming to be on Crozet I. in early June, turned out to be the work of a pirate, thought to have been operating from Australia or New Zealand. Legitimate stations worked toward the end of the year were: ZC4AB (UK bases on Cyprus), Z21GZ (Zimbabwe), XQ0X (San Ambrosio), 6W6JX (Senegal), and ST0DX (Southern Sudan). Eddie, G0AZT, and I activated both V2 (Antigua) and VP2M (Montserrat) in September and October that year. The pileups were tremendous, but not all of them were for us!

After a couple of days on Montserrat, Eddie and I could only watch the screen as ZA1A took over the 20 meter band by activating Albania for the very first time on RTTY. It was fun watching the pileup from a DX location. But it wasn't much fun realizing it wouldn't count for either one of our DXCC totals!

1992: A Year to Remember

Bob Stewart, signing KW2P/KP1, opens up on New Year's Day from Navassa I. Bob becomes an excellent DX RTTY operator while handling the pileups. Ray, 7P8SR, gets on RTTY and becomes a new one for many. Ray is still active from Lesotho, but has not been seen on RTTY lately. What gives Ray?

VP8CFM signs from the South Orkneys in late January. The operator, Brian (homecall unknown, but possibly from Scotland), is so active during the year, that it was not uncommon to have a ragchew with him. Unfortunately, since he has left the islands, there has been little, if any, activity from the South Orkneys. John, the lobster fisherman turned RTTY DXer, kept XQ0X active from San Ambrosio I. off the western coast of Chile with equipment donated by the IRDXA.

The next major RTTY operation of the year occurred in February. KD7P/NH7 came up on RTTY from Kure Island. There has been no other operation from Kure I. since then on RTTY. (Or on any other mode, as far as I know. I need it on CW!) There are many questions floating around as to the future of this DXCC country. This country will no doubt rise toward the top of the Most Needed List quickly, unless someone can get there to put it on the air soon.

H44JS shows up on AMTOR from the Solomon Islands. Although RTTY is thought of to be the main digital mode for DX, new countries are to be had by the other digital modes as well. KK6RT/KH0 signs from the Mariana Islands in March. I get my opportunity to work Albania the same month as ZA1TAA gets diddling. The FO0CI Clipperton I. DXpedition also occurs in March, and they are very active on RTTY. Things are looking up for the year.

7Q7BR comes on from Malawi courtesy of Japan. Henry, ES7FQ, has a major signal out of Estonia. One of the most rare of all countries in the Soviet Bloc, Azerbaijan, is represented by Alex, RD6DZ. John, AP/WA2WYR, is very active from Pakistan and is worked in the BARTG contest on 10 meters from the USA! Max, A45ZX, comes up from Oman. VK9CL shows from Cocos-Keeling I. PY0FZ puts Fernando de Noronha on the digital airwaves. Eddie, G0AZT activates Bermuda (VP9). All this happens in March!

The South Sandwich Island DXpedition shows up on 10 meter RTTY April 1 signing VP8SSI. This is no April Fool's Day joke. Tony, WA4JQS, does a great job at the keys. On their return trip to the Falklands, the group stops off at South Georgia for a day, and a few RTTY contacts are made from there. LA4LN signs from American Samoa, KH8. The Hungarian tour makes it to Bangladesh in late April and signs S2/HA5BUS.

In May, RI6C/UA4FDS comes up from Uzbekistan. ZD7GT operates RTTY from St. Helena I. CN8NP from Morocco, and A92FG in Bahrain also show up this month. The MV Island DXpedition starts RTTY at the end of the month and continues into June as 4J1FS. June continues the DX extravaganza with operations from V63BJ (Micronesia), RH0W/UA4FDS (Turkmenistan), FO4OD (French Polynesia), A71BS (Qatar), and 9M8ZZ (East Malaysia).

In July, we start hearing signals from the Balkans! On RTTY, YU3FX signs from Slovenia. There were overlapping periods of time when the four new countries were using their old prefixes, yet counted as new countries. The old prefixes were: YU2 (Croatia), YU3 (Slovenia), YU4 (Bosnia-Herzegovina), and YU5 (Macedonia). Before official DXCC status, stations in Bosnia and Macedonia were signing 4N4/4O4 and 4N5, respectively. It was kind of a mess. But it was fun trying to figure it all out. And it was wonderful to hear signals from that part of the world again. July also gives us FR5ZU (Reunion I.), 5H0ROA (Tanzania), 7Q7XX (Malawi), and UG6GG (Armenia).

In August, Croatia comes up on RTTY with 9A1CCY. UF6FDR and RF6FC show from Georgia Republic. 9X5LJ chirps AMTOR from Rwanda. Jose, EA7EL, activates rare Angola signing portable D2, then obtains the callsign D2EL. JW2IJ (Svalbard), CX4DX (Uruguay), KK4DK/KH9 (Wake I.), and Alex, UJ8JCQ (Tadzhikistan), round out the month.

In September, Jacques, FR5ZU activates both Glorioso (FR/G) and Europa (FR/E) on RTTY. C9RJJ makes an appearance from Mozambique. UG7GWY gets on from Armenia. In the CQWW RTTY contest this month, Eddie (G0AZT), Ron (KP2N), Frank (N0FMR) and myself operate P40RY from Aruba, making 2222 RTTY contacts in 48 hours.

Eddie gets stuck in Aruba for an additional month. Seems that U.S. Immigration officials did not like the idea of him coming and going in and out of the States as often as he was. He signs P4/G0AZT, and P40RY in the first ever JARTS RTTY Contest in October and wins Single Op World. (Much to my chagrin, I placed second!) VE1CBK activates CY0NSM on Sable I. H44JS signs from the Solomons. OH1AF/OJ0 is a nice catch from Market Reef (I thought I made a contact with them, but got SNIL'ed "Sorry Not In Log". I still need it!) Jim Smith, VK9NS puts VK9WW on the air from Willis I. and gives many a new one on RTTY. 5U7M (Niger) finishes off the month.

November entries into the logbook include XT2BW (Burkina Faso), HK0DPA (San Andres I.), ZL7AMO (Chatham I.), DU1RP (Philippines), and S79S (Seychelles). Bojan, ex-YU3CN, sports his new prefix and signs S51CN from Slovenia. December notables were 5X5WR and 5X5MB (Uganda), ZK2XJ and ZK2XI (Niue I.), and 5R8DG (Madagascar). Just as he did to ring in this incredible year of digital DX, Bob, KW2P, lays 1992 to rest by appearing on RTTY signing portable KP5 (Desecheo) on New Year's Eve. Whew!

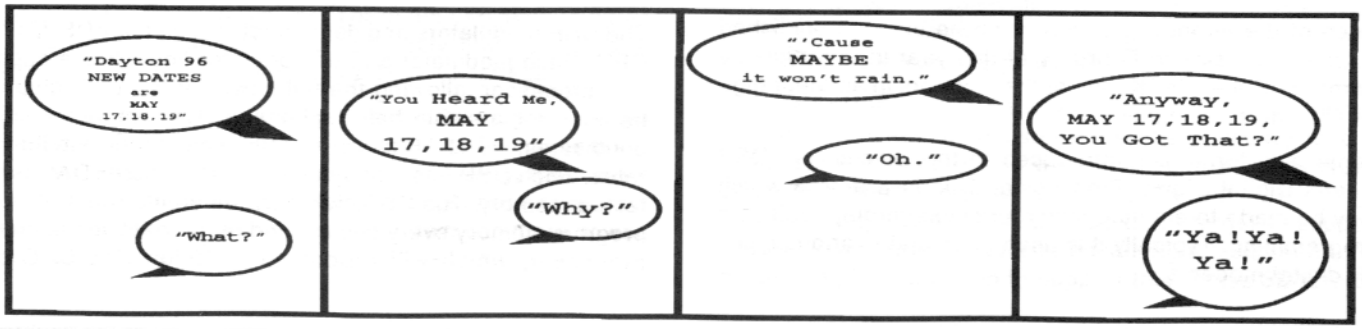
1993: Czechoslovakia Splits into 2 New Ones

The start of 1993 found DX'ing in a state of confusion. Three of the four Yugoslavian countries were officially added to the DXCC list on January 1. Macedonia was officially added in June. Contributing to the madness was the making of two new DXCC countries out of Czechoslovakia. The Czech Republic kept the OK prefix, and Slovakia started signing with OM. Czechoslovakia became a deleted DXCC country. Although these two new ones were not officially added to the DXCC list until June, contacts for DXCC credit were good from January 1.

This was a very exciting time in DX'ing on any mode. Six new countries being added the DXCC list all in one year was a catalyst for making 1993 great for DX, especially on RTTY. We knew it was going to be a good year when Bob, KW2P/KP5, showed up on RTTY again on New Year's Day '93 from the Desecheo DXpedition. Remember what happened in 1992?

(You will have to wait until the February issue to continue Don's interesting tour. Stay tuned - ed)

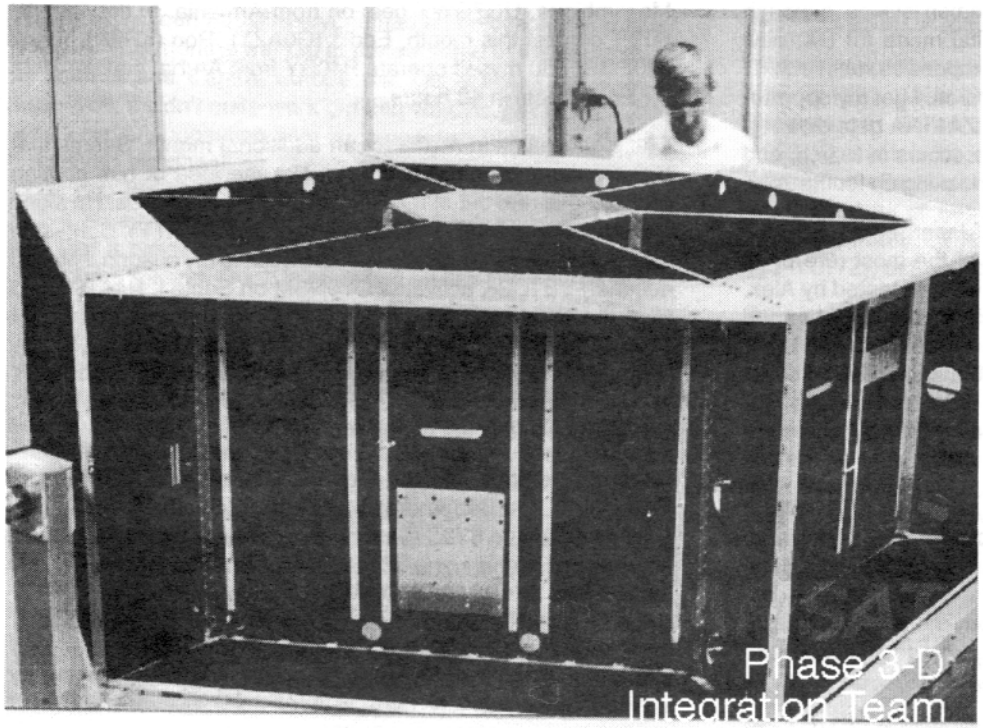
1996 DAYTON HAMVENTION



DIGITAL SATELLITES

How to work 'em and more out-of-this-world info

by David Medley, KI6QE/VK2IMJ
1020 West Oleta Drive • Tucson, AZ 85704 • CIS: 74072,1261 / Internet: dmedley@indirect.com



A NEW ERA IN SATELLITE DIGITAL COMMUNICATIONS

In late 1996 a new Amateur Communications Satellite will be launched for AMSAT by the European Space Agency on board a new Ariane launcher from Korou in French Guiana. This satellite, referred to today as "Phase -3D or P3D", represents a giant step forward from present day Amateur Satellites.

It is being largely financed by contributions from individual Hams and Organizations and the design and construction work is mostly being carried out by volunteer labor both in this country and overseas. There is still much money to be raised and it is hoped that readers of this and my previous articles might respond by sending donations to either AMSAT or the ARRL. You can also send donations to TAPR (Tucson Amateur Packet Radio) as they are providing additional finance and expertise for the RUDAK system which will be explained here.

Much of the information contained herein was published in QEX magazine in February of this year in an article by Harold E. Price, NK6K, one of the pioneers in amateur digital satellite technology.

Some new terms are introduced in this discussion. DSP means Digital Signal Processing. This is a device which may be made to emulate many functions through software programming. Typically it is used to emulate various types of digital modems..

The Phase 3D satellite will weigh approximately 400 kilograms and will have up to 250 watts output PEP, or about 60 watts continuous. Of that 60 watts the digital transponder (called RUDAK-U) will have about 20 watts allocated to it. The digital RF inputs and output come and go through a 10.7 Mhz IF matrix, giving access to a variety of uplink and downlink frequencies. The actual frequency bands are set out in Table I .

P3D will be flying a plethora of DSP-based modems. While the Surrey Satellite Technology UoSATs were the first to fly DSP modems on amateur spacecraft, P3D will be flying eight modulators and eight demodulators. The modems can appear anywhere within the digital sub bands described in Table 1.

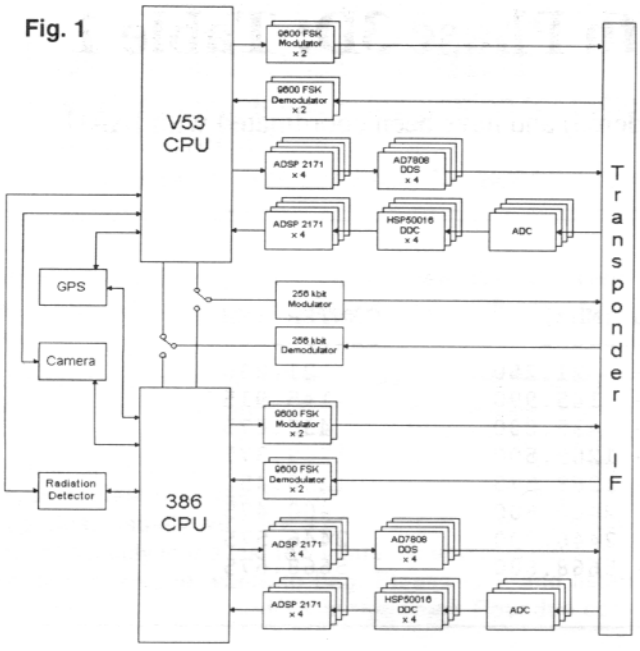
Most of the information below comes from the RUDAK-U project manager and lead hardware designer, Lyle Johnson, WA7GXD. The design is near final, but still subject to change. The basic configuration of the digital section is shown in Figure 1. There are two CPUs, a V53 and an 80386. Each will have 16 MB of EDAC protected program and file storage space. Each processor has a connection to the payloads, via serial port, the one Mbit CAN-bus, or both. Each processor has its own set of "low" speed DSP-based modems (up to 56 kb or so). The processors share a single 256 kb modem.

The two main processors are reloadable from the ground or each other. The DSP modems and payloads are reloadable from the ground via the main processor's onboard storage. The processors/DSP modem complex has 18 programmable processors.

The 9600 baud modems are hardwired, and will be used for the initial loading and as backup to the DSP modems. They will be on fixed frequencies in the digital sub band. At least one of the frequencies will not be published, to provide a contention-free command and loading channel.

The DSP modulators and demodulators use the ADSP2171 CPU. Each modulator and demodulator chain has a separate processor, allowing the full power of the DSP chip to be used for a single half duplex link. This will allow high baud rates, up to 56 kb, or very heavily coded low baud rates. Each DSP has 10k bytes of internal, non-EDAC protected memory. The DSPs will perform an internal CRC on program memory every second and report back to the main processor, which will reboot the DSP on bad CRC or

Fig. 1



timeout.

A demodulator is fed from a high speed video ADC. Though each demodulator could use its own ADC, each is seeing the same IF and could share an ADC with one or more other demodulators. The decision, as always, is one of redundancy versus complexity and has not yet been made. Each demodulator uses its own HSP50016 Digital Down Converter (DDC) to convert the digitized 10.7 Mhz IF to a frequency range more suitable for digital processing.

This also allows the uplink frequency to be anywhere in the passband, under software control. Likewise, the modulators use the AD7008 Direct Digital Synthesizer (DDS) to generate 10.7 Mhz IF. This allows the modulators to also appear anywhere in the passband, under software control. The DDC and DDS allow the processor to specify a phase increment to an internally generated sine wave. The DDS also allows an amplitude to be specified. Since the DSP need not generate each point on the sine wave the input and output frequencies can be much higher than DSP chip alone could use.

The DDS and DDC can be used to allow each ADSP2171 to process more than one low bit rate signal at a time, giving us more than 16 uplinks, perhaps as many as 32 or 48 low bit rate uplinks. What could we do with such a thing? Why, that's the fun part, of course. Readers are invited to send in application ideas for all this horsepower. Before we get too carried away with thoughts of competing with Qualcomm and Orbcomm, let's review the link budget.

TANSTAAFL

The above is an acronym for "There ain't no such thing as a free lunch," a phrase which probably first appeared in Robert Heinlein's "The Moon is a Harsh Mistress".

The P3D orbit (43,000 km) has a few advantages over the Low Earth Orbit (800-1300 km) spacecraft digital users are used to. The spacecraft is much further away, meaning it moves more slowly and is visible for longer periods of time. It is also larger, meaning it can generate much more power, for louder downlinks.

Here is the TANSTAAFL part. Since P3D is much farther away than a LEO satellite like KO-23, the path loss is also much greater. The increased path loss, in fact, just about wipes out the advantage of the higher power. For example, consider the case of a typical ground user of the 9600 UoSAT spacecraft, U0-22, KO-23, and KO-25. Most of them have what is called an "Oscar 10" class station, meaning tracking antennas with about 10 dB gain, and 10 to 100 watts of uplink power. For the LEO satellites, with about two watts on the downlink, this gives plenty of link margin.

For P3D, a similar amount of downlink power results in -0.1 dB of margin. There is a rule of thumb in the amateur satellite world that says the link margin on paper needs to be about 10 dB to give adequate performance at a typical user station. This 10 dB is usually labeled "implementation loss", and in many cases, equates to the inability to correctly place an N-type connector on a piece of coax. Some link margins for P3D, and the data you need to compute your own, are in Table 2.

This needs to be well understood. Much of the PR the P3D campaign sends out has been talking about 250 watt transmitters and much improved link performance for current users. The 250 watt figure and the improvements are from the point of view of current AO-10 and AO-13 voice users, not the current LEO 9600 baud data users.

Still, the goal of the RUDAK-U module is to service the current digital satellite user community. To do this, it is necessary to assign a substantial amount of the downlink power budget to a single 9600 baud downlink in the 70 cm band. This leaves the challenge of finding interesting applications for lower power, but presumably more heavily DSP-processed modulation schemes. Matching DSP modems on the ground will also be needed.. In fact, the P3D project could well exceed the current amateur capacity to generate modem software.

There are other factors to keep in mind. RUDAK can transmit on more than one downlink band at a time. For example, it is expected the spacecraft will often be in a mode allowing both the 435 Mhz and the 2400 Mhz downlink to be used. While servicing old-style users on 435 at 9600 baud, P3D could also be handling gateways with big antennas and higher data rates at 2400 Mhz. Back in the TANSTAAFL category, while each user will have a longer access time, several hours instead of ten minutes per pass, more users can see the satellite at the same time. Will this lead to more contention, or will the long access times lead to less contention, since users aren't all trying to download in the same ten minute interval?

All in all, it is expected that access to P3D from current UoSAT 9600 baud FSK class stations will be provided. It is expected also to provide access to Microsat 1200 baud PSK users. Also simultaneously on the same or other bands access will be provided with new modulation schemes and protocols. There will be fun for protocol developers as well as software modem designers on this mission.

Final assembly of this satellite is taking place in Florida and future articles on this subject will keep you advised of progress. For those of you who have access to the World Wide Web don't forget to check the AMSAT Home Page regularly (http://AMSAT.ORG) Also don't forget to support AMSAT in any way you can by becoming a member and/or by sending in a donation to support this Phase 3D effort.

Digital Communications with Phase 3D: Table 1

These are the final P3D frequencies (crystals have been ordered) and have been coordinated with IARU bandplans. Data is from the AMSAT News Service.

UPLINKS

BAND	DIGITAL (MHz)	ANALOG (MHz)	CENTER (MHz)
15m	N/A	21.210 - 21.250	21.230
2m	145.800 - 145.840	145.840 - 145.990	145.915
70cm	435.300 - 435.550	435.550 - 435.800	435.675
23cm(1)	1269.000 - 1269.250	1269.250 - 1269.500	1269.375
23cm(2)	1268.075 - 1268.325	1268.325 - 1268.575	1268.450
13cm(1)	2400.100 - 2400.350	2400.350 - 2400.600	2400.475
13cm(2)	2446.200 - 2446.450	2446.450 - 2446.700	2446.575
6cm	5668.350 - 5668.550	5668.550 - 5668.800	5668.675

DOWNLINKS

BAND	DIGITAL (MHz)	ANALOG (MHz)	CENTER (MHz)
10m	29.330 MHz +/-5 kHz	(To be used for digitized voice bulletins)	
2m	145.955 - 145.990	145.805 - 145.955	145.880
70cm	435.900 - 436.200	435.475 - 435.725	435.600
13cm	2400.650 - 2400.950	2400.225 - 2400.475	2400.350
3cm	10451.450 -10451.750	10451.025 -10451.275	10451.150
1.5cm	24048.450 -24048.750	24048.025 -24048.275	24048.150

All downlink passbands are inverted from the uplink passbands.

BEACONS

BAND	Beacon-1	Beacon-2
2m	N/A	N/A
70cm	435.450	435.850
13cm	2400.200	2400.600
3cm	10451.000	10451.400
1.5cm	24048.000	24048.400

Original article by Harold E. Price, NK6K (nk6k@amsat.org), published in QEX, The ARRL Experimenter's Exchange, February 1995. Hypertext conversion by and feedback to KB5MU.

Table 2 on page 21

The Contest Chair

Hints, Tips, Techniques & Inspiration for better scores

by Ron Stailey, AB5KD

504 Dove Haven Dr. • Round Rock, TX 78664 • Internet: ron481@austin.email.net

Hello Contesters and DXers. Happy New Year to everyone. I wish all of you a very successful 1996 contesting year.

Well folks it's January and that means it "WAR" time especially for those of us here in the U.S. and Canada. Yes it's time for the ARRL RTTY Roundup, considered by many to be the biggest event of the year. Roundup is a blow-and-go type contest with lots of action from start to finish in all categories. Usually we have a good showing from DX stations, especially in the last few years. Roundup is definitely a contest everyone wants to bag. Please look and listen for me using call sign W5KFT in this years Roundup contest..

In the Nov/Dec issue on the NCJ (National Contest Journal) page-3. I found something interesting and down right funny at the same time. The Editor of the NCJ is Bruce Draper AA5B, a pretty well known contester in CW and SSB modes. He had a few comments in his Editor's column about RTTY contesting. I wish I had the space to reprint his entire statement, but I will try to summarize as best I can.

Bruce's statement said he had the opportunity to operate in CQWW RTTY and had a lot of fun the first time. But it felt a lot different this time. As he sat in a comfortable operating position, effortlessly running stations at a 90/hr clip while watching TV, reading a magazine, and eating a snack. It just didn't seem the same. He says after a few hours it hit him WHY? There wasn't very much human interaction involved. Aside from pointing and clicking the mouse a few times each minute, he just wasn't doing that much. This wasn't the kind of contest he craved; in fact, this wasn't operating at all! The computer seemed to be doing most of the work. In reality, a RTTY contest station could be totally automated fairly easy, leaving absolutely no operating fun for the station owner. He wants the feeling of being more of the station. (Now as I said above he said a bunch more and I am summarizing a bunch.)

I have about seven things I would like to comment on:

1. Bruce, all you need to do is get yourself an old 28ASR with an old ST-6, maybe a Tempo One Radio, and log by hand. I guarantee you'll be in the action. I doubt you will stay with it for very long, but you will be in the action.

2. About your effortless 90/hr clip while watching TV, reading a magazine, and eating a snack—I'll go for that. I had a few 90/hr clips and even a couple of 100/hr clips in RTTY mode at K1NG during CQWW in our M/M effort in '94. But I wasn't watching TV or reading a magazine. I was as busy as a one legged man in a butt kicking contest. If you can do that effortlessly more power to you, I bow to you superior operating skills.

3. RTTY not being real contesting- Hmmmm! I have used "TR" software and it has made CT & NA software obsolete. Using all these little helpers in a CW contest and you still feel you are in the action? Sorry, but TR S/W will do "10" times more for CW Ops than any RTTY program will do for us. If RTTY isn't real contesting, then CW isn't either.

4. RTTY being easily automated—You may be right. But you can do the same thing in CW mode too. If everyone will run the same speed, say 30 wpm, during a contest it will be easy. If you don't think so lets try it and see! I'll bet you gain at least 30% in participation, and your scores will double within a year. (If you try it for a year)

5. Computers doing all the work, the human out of the picture all together—Computers are doing 90% of all the work in CW and SSB also. CQ-ing, logging and keeping up with the dupes is 90% of the contest (not to mention all the other things it does for you).

6. RTTY is by far the fastest growing contest mode in the World, if not the only one. So, if what Bruce says if true, all of us are in the same boat.

7. The way I see it—the more people we can get into contesting the better. I read article after article of guys saying that when they go to Dayton and other conventions, the only thing they see changing from year to year is the color of each others hair. That's not the case with RTTY Contesters. Every year we get more and more. With most of them being quite young. Now there aren't as many hams willing to spend the whole weekend sweating blood trying to win a contest like we did in the past. Most of our mults and contacts come from non-contesters anyway. Most all of them just want to have a nice weekend away from work, have a little fun and maybe scan the bands a little. With computers and software that makes it EASY for non-contesters to join in the action, they can work a new country, put out a mult or two, or just see how many QSO's they can make in any given time. If someone wants to be in a recliner or in bed to do a contest that's fine with me, it's darn sure better than not having them on at all. Isn't it? Whatever digital groups are doing to get new contesters to join in is working. We are growing at a pretty fair rate in just about every contest so we must be doing something right. Thanks to the Digital Journal and other publications like her. RTTY contesting is here to stay. You can count on it..

One other thing I would like to mention. I was reading the ads in the Journal's Software Store a few months back, and the one that really caught my eye was SNAP (for DX propagation predictions, by Crawford WA3ZKZ). I have tried one or two of these things before, sometime they work, but most of the time there off by at least two days. For some reason I decided to give SNAP a try. Much to my surprise I have been very happy with SNAP. It has been right on the mark every time I've used it. For a contester, the neatest thing I found about it was the short opening on other bands it told me about. (This is very important information when most all the action is on 20m in this part of the cycle.) I went to the band/path it recommended and started CQ-ing. Lo-and-behold I started getting new mults and contacts. SNAP is very reasonably priced. How many times have you

said I would pay five bucks for a new mult? Well I have said it during just about every contest I've been in, especially on Sunday afternoon. SNAP has given me more than three mults, so at five dollars a mult, it's paid for it's self in my book. Anything that can help me get new mults is worth 15 dollars to me. Give it a try I think you will be happy with it.

This month we will visit with, Sarkezi Arpad YU7AM in Andrica Yugoslavia. (Note: I wrote Arpad well over a year ago asking for information so I could write an article about his station and his contesting achievements. His letter to me was dated 15 Sept 94. I received it on 3 Oct 95. I figured I better run this article before all his information has changed. Think God for Internet. Snail mail is the pits...)

Arpad as he likes to be called, is 47 years of age. Has been a ham since 1967. (If I understand it right, it takes two years to acquire a call in Yugoslavia!) Arpad received his first license in 1969, and was issued callsign YU1NWJ. He used that call until 1981 when he got his present call YU7AM. Arpad is married with two children. His XYL and daughter haven't shown any interest in amateur radio as yet. However, his son Zoltan took his exam in 1993 and still didn't have a license at the time of this writing.

Arpad has been operating RTTY since 1975, he has contacted 170 countries, unfortunately only 105 confirmed in RTTY mode so far. Up-to-date/state-of-the-art radio equipment isn't quite as easy to come by as it is here in the USA.

Radio's antennas and equipment:

In his early days of RTTY contesting, he used a T-100 Siemens along with a DJ6HP modem. Since 1982 he has been using a Commodore 64 computer with a modified DJ6HP modem, His Radio is the Yaesu FT-101 series (22 years old) with a home-brew amplifier and a pair of 4-400A's as finals. His tower is 19 meters (62.3 feet) high with a TH3MK3 tribander antenna. For 40/80m there are inverted V's and sloper wire antennas. His software originated from ON6IV but he has made several improvements to it for contesting.

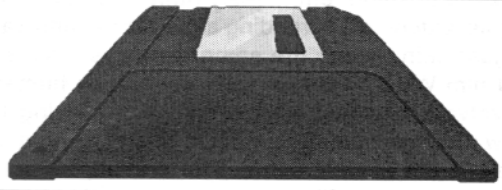
Contest operations is what he likes to do most. He likes the action, working new countries, picking up a new mult through heavy QRM, (which isn't easy in RTTY mode). Arpad most always does S/Op operations. He says he will

(cont'd on page 22)

SOFTWARE TOPICS

News & Reviews

by Bob Boyd, W1VXV
P.O. Box 571 • Kennebunkport, ME 04046



Log Windows, Release 3.0

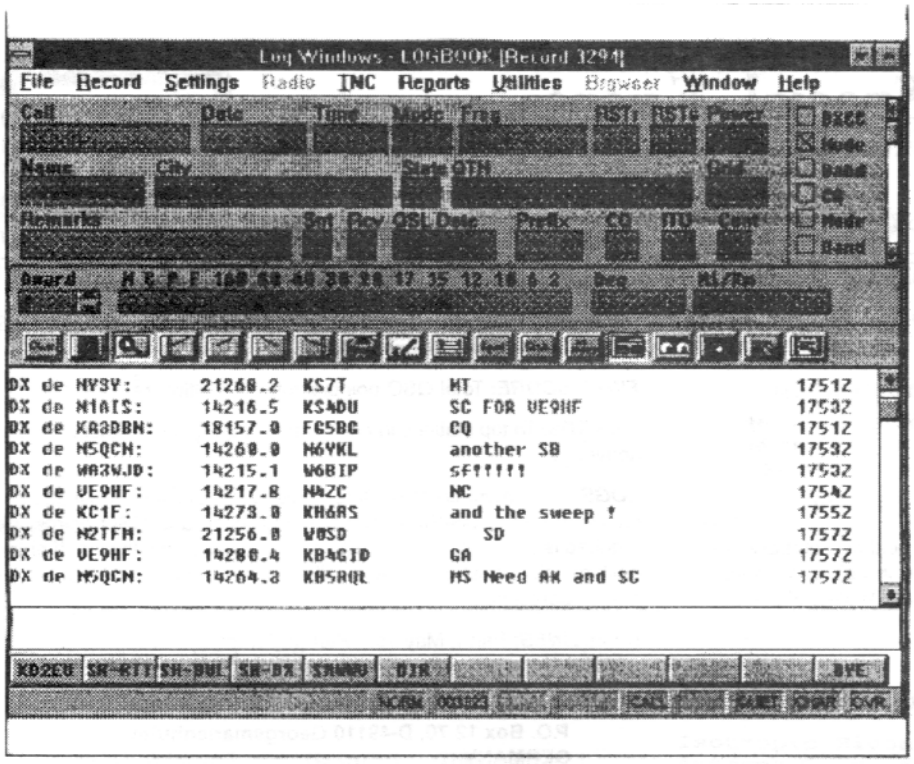
In April and November of 1994 I reviewed the first two releases of AEA's Log Windows, an application which runs under Microsoft Windows and provides the functions of logging, award tracking, transceiver and rotor control, interface to a packet DX cluster, CD-ROM callbook, and QSL manager. In the summer of 1994 I migrated my old logs from paper logs and from a DOS-based logging program, and then spent a number of hours to ensure that the Log Windows awards records agreed exactly with my official DXCC, WAS, WAZ, and USCA awards records. Now if I am operating in a contest, I use WF1B's RTTY software (in a pure DOS environment) and I import the WF1B logfile into Log Windows at the end of the contest. When I am not in a contest I run AEA's PC-Pakratt for Windows and Log Windows as concurrent applications, with Log Windows providing the connection to the packet DX cluster, and I log contacts as I work them. I access both a CD-ROM callbook and my Go-list as needed, and I print QSL and address labels with a COSTAR label printer, all from Log Windows while I am in QSO. I don't currently control my transceiver or rotor from Log Windows, but I have used those features in the past, and they work fine. At any time I can query Log Windows to determine, for example, the operator's name and QTH, if I need a contact for an award, if a QSL has been received for a previous QSO, etc.

Screen-prints do not do justice to how a screen appears on a SVGA monitor, but the following depicts the LogWindow screen with a typical log record in the top half and packet cluster spots in the lower half:

The new features in Log Windows Release 3 include:

- Many enhancements to the user interface, menus, and buttons
- A full-time database browser
- Operator notes may be entered for a given call
- Support for new transceivers, with comprehensive radio control features
- Support for additional CD-ROM callbooks
- Support within import for additional logging programs
- A new internal QSL manager

A status bar has been added at the bottom of the Log Window main screen which contains program status information. Toolbar button help is displayed in the message area of the status bar



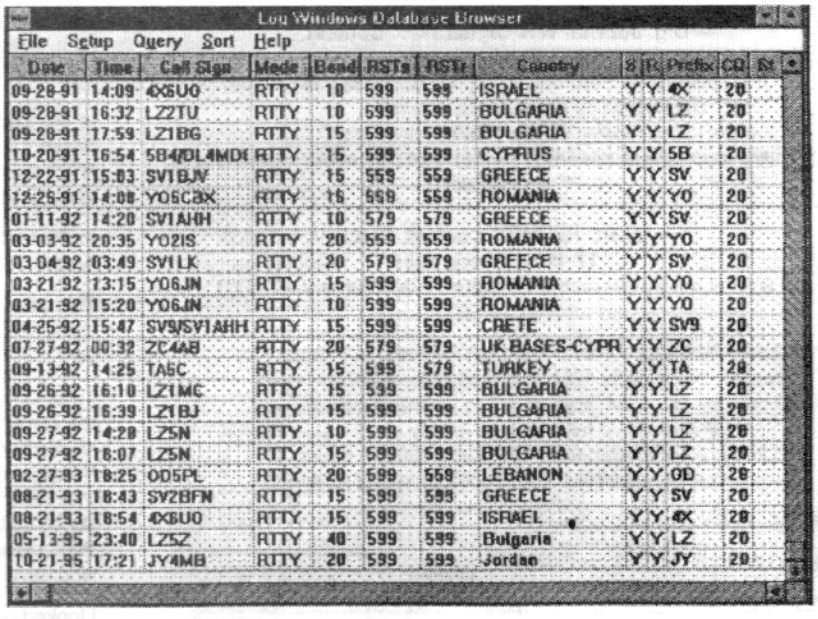
when the mouse cursor is positioned over a button. Toolbar buttons have been added to query the online callbook, query the QSL manager database, and enter/view an operator note.

There are now two versions of database browser; the pop-up version is intended for the user who also utilizes the packet interface, and the full-time browser is for use by users who do not require the packet interface. The full-time (or client area) browser is displayed on top of the packet window; the pop-up browser may be placed anywhere on the desktop. I find the pop-up browser very useful for ad hoc queries while QSOing or searching the bands. An example of the pop-up browser appears in the following screen-print. The browser window was maximized and it shows confirmed RTTY contacts from CQ zone 20.

An operator note is a field containing up to 255 characters which will exist for all occurrences of a callsign. If a note exists, "NOTE" is displayed in the message area of the status bar. It may be retrieved by clicking on the note button. I particularly like the way this feature works!

Log Windows Release 3.0 adds support for the following transceivers: Japan Radio JST-145 and JST-245, Kenwood TS-870S, and Yaesu FT-1000MP. The support includes the ability to use the PC's numeric keypad to directly enter the rigs frequency. Support is also added for the following CD-ROM online callbooks: AmSoft, PerCon's Ham db, and Radio Amateur CallBook. I should point out that Log Windows automatically retrives name and address info (including U.S. county, providing the CD contains county data) from the online callbook and inserts the fields into the the log record.

Hams have been eagerly waiting for the Radio Amateur Callbook publishers to produce a CD-ROM containing both international and U.S. data; the 'Flying Horse' CD-ROM was finally shipped in November. If that CD is used as a stand-alone product there is no provision for printing, but when coupled with Log Windows, printing is just a mouse-click away! I can't emphasize strongly enough the pleasure in beng able to quickly view or print name and address for any country; QSLing is much less of a drudgery now.



The Log Windows Import utility now supports KD7P's LogPlus! and WF1B's RTTY logfiles in addition to the eleven other formats which were supported in the prior release. This feature enables you to take a log from another program, for example CT or WF1B's RTTY, and quickly and accurately load the QSO data into Log Windows. As mentioned earlier I use this feature regularly to import my contest logs from RTTY.

Log Windows supports the "Golist" QSL manager as well as a new internal QSL manager called LWQSLMgr. LWQSLMgr will come with Log Windows populated with several hundred QSL routes. The user can add, change, and delete records from this database at will. I haven't made use of this yet but can foresee that it may be very useful.

There are many other instances where things in this release have been enhanced, polished, and fine-tuned. Ira, WA1W, is determined that the product shall be full-featured, easy-to-use, and completely accurate; he has been very responsive to suggestions for enhancements. For me, Log Windows has certainly made operating easier and more fun, and has taken all the tedium out of record keeping! I heartily recommend the product.

Contesting & Special Events

The latest & greatest digital contesting news

by Rich Lawton, N6GG
14395 Bevers Way • Pioneer, CA 95666

— RTTY Contests - Coming Events —

Date:	Contest:	
JAN 6-7 '96	ARRL RTTY Roundup	(USA)
FEB 10-11	Dig. Journal WW Digital WPX	(USA)
FEB 17-18	DARC HF RTTY, Part I	(German)
MAR 16-17	BARTG Spring RTTY	(English)
APR 6-7	EA WW RTTY	(Spanish)

NOTE: The Digital Journal WW Digi WPX will be held on February 10-11, as stated above. It's the second full weekend in February. In last month's column I had it as the first full weekend, which was, of course, absolutely wrong.

— Reminders for Logs —

TARA Sprint Contest (December 9-10) logs must be received by January 17, 1996.
Mail logs to:
Bill Eddy, NY2U
c/o TARA, 2204 22nt St
Troy NY 12180

ARRL RTTY Roundup (January 6-7) logs must be postmarked before February 5th.
Mail logs to:

ARRL RTTY ROUNDUP, 225 Main ST
Newington CT 06111

— — COMING UP — —

— Dig. Journal WW Digital WPX Contest —
10-11 February, 1996
from 0000 UTC Saturday to 2400 UTC Sunday (48 hours)
Sponsored by IDRA Digital Journal
(ref: WS7I)
(See Jay's complete coverage and info of this event elsewhere in this issue)

— DARC HF RTTY Contest, Part I —
17-18 February, 1996
Sponsored by Deutscher Amateur-Radio-Club e.V. (DARC)
(Ref: DF5BX)

CONTEST PERIOD: • Part I: Third full weekend in February on
Saturday: 20, 15, and 10M: from 1000Z to 1600Z (6 hours)
Sunday: 80 and 40M: from 1400Z to 2000Z (6 hours)
• Part II: Third full weekend in July on
Saturday: 80 and 40M: from 1400Z to 2000Z (6 hours)
Sunday: 20, 15, and 10M: from 1000Z to 1600Z (6 hours)

MODE: RTTY (Baudot) only

BANDS: 80, 40, 20, 15, and 10M

CLASSES: A - Single op B - Multi-op C - SWL

EXCHANGE: USA stations: send RST + QSO nr. + name + State
All others : send RST + QSO nr. + name

MULTIPLIERS: Each DXCC/WAE country, and each USA state, and each call district in JA, VE, and VK, (NOT USA), regardless of band.(NO band multipliers) For USA stations, count only the FIRST QSO with a USA station as a DXCC/WAE country multiplier, regardless of band.

QSO POINTS: Count 1 point for QSO with own country. NOTE: States of USA are not counted as countries Count 2 points for QSO outside your country but within continent. Count 3 points for QSO outside your own continent.

FINAL SCORE: Total QSO points x total of multipliers.

AWARDS: To top stations in each class, country and district mentioned above.

LOGS: Logs must contain: Date, Time UTC, Callsign, Message sent/received, name, US-State, first-time-multiplier, and QSO points. Also required is a Summary sheet with a list of claimed multipliers. If entry is multi-op, please list names and callsigns of all ops. Comments are very much appreciated.

DEADLINES: Part I: May 1st. Part II: September 1st.
Mail entry to:

Werner LUDWIG, DF5BX
P.O. Box 12 70, D-49110 Georgsmarienhutte
GERMANY

COMMENTS: There are 2 distinct contests here: Part I is in February and Part II is in July. Each part is identical except for the date, and the bands to operate on. In addition, each part is divided into 2 distinct time segments, each 6 hours long. The "**Saturday segment**" of Part I is for operation on 20, 15, and 10M, and runs from 1000Z to 1600Z. The "**Sunday segment**" of Part I is for operation on 80 and 40M, and runs from 1400Z to 2000Z. Part II, in July, reverses the band operation for Saturday/Sunday segments. Got that? GOOD!

NOTE: There are no multipliers for USA call areas. Just the STATES count for mults. Also, NO band multipliers. This means that only your FIRST USA QSO in the contest will count for a DXCC/WAE country mult, along with the State mult.

-+- Contester's Age - Revisited -+-

In the December '93 issue I wrote about how old we contesters are. I based my source on the contest exchange (RST + Age) of the JARTS RTTY Contest in October '93. Adding up the ages of my 196 QSOs on 20M, divided by 196 came to 47.38 years.

In December '94 I did the same thing. I had 224 QSOs on 20M. Answer: 50.27 years.

This year I took just the first 100 QSOs on 20M of Ws and JAs. Of these, 34 were JAs. Average age of USA RTTY contesters was 49.1 years. For JAs it was 43.4 years.

I was talking to Ken Anderson, K6PU, about this age thing. He noticed the same thing when he was checking over 100 logs submitted for the '95 CAlifornia QSO Party (CW/SSB) sponsored by NCCC. He said the average age for CQP operators was around 50 years. He also noticed that there was a "scarcity gap" around the 25 to 45 year olds. Ken mentioned that he received a log from an operator who was only 8 years old! Well, I said, "I've got that beat. I had a JARTS QSO with a Frenchman who gave his age as 82!"

I looked over my log sheets later and noticed a similar "age dip" in the JARTS contests. This age group was born during the 1950-70 years, an unsettling time of post WW II, the Cold War, the Korean War and the VietNam fiasco. It also was a time of great technological achievements, such as; TV, the H Bomb, mainframe computers, the transistor, integrated circuits, man on the moon, etc.

Why the "age dip?" Was there a distraction away from the great hobby of ham radio during the 50's and 60's? I'll take the easy explanation: blame it all on TV!

((73)) See you in the pileups, Rich, N6GG

(Cont'd from page 16)

Digital Communications with Phase 3D: Table 2

Phase 3D Downlink Margin

Downlink, 9600 baud FSK

Frequency, MHz	436

Spacecraft

Transmitter power, dBm	43
Line Losses, dB	0.7
Antenna Gain, dBic	13

Path

Sat. Altitude, km	43800
Max. distance, km	49765
Polarization Loss, dB	0
Atmospheric Loss, dB	0.3

Ground Station

Isotropic Signal at Ground, dBm	-134.1
Antenna Gain, dBic	13
Sky Temperature, K	50
Feedline Loss, dB	1
Receiver NF, dB	0.5
Bandwidth, kHz	15
Data Rate, symbols/sec	9600
Receiver Noise Temperature, K	169.6
Receiver Noise Power, dBm	-134.5
User S/N, dB	13.4
Link Margin	9.9

The spacecraft antenna gain at 146 MHz is dBic, at 2400 MHz it is 18 dBic.

Phase 3D Uplink Margin

Uplink, 9600 baud FSK

Frequency, MHz	146

Ground Station

Transmitter power, dBm	40
Line Losses, dB	1
Antenna Gain, dBic	12

Path

Sat. Altitude, km	43800
Max. distance, km	49765
Polarization Loss, dB	0
Atmospheric Loss, dB	1

Spacecraft

Isotropic Signal at Spacecraft, dBm	-119.6
Antenna Gain, dBic	10
Sky Temperature, K	300
Feedline Loss, dB	0.7
Receiver NF, dB	1
Bandwidth, kHz	15
Data Rate, symbols/sec	9600
Receiver Noise Temperature, K	438.9
Receiver Noise Power, dBm	-130.4
User S/N, dB	20.8
Link Margin	7.3

The 1270 ground antenna gain is for a 1 meter dish.

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James E. Mortensen Editor — 10/21/95

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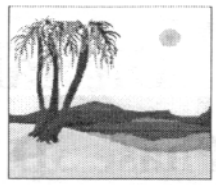
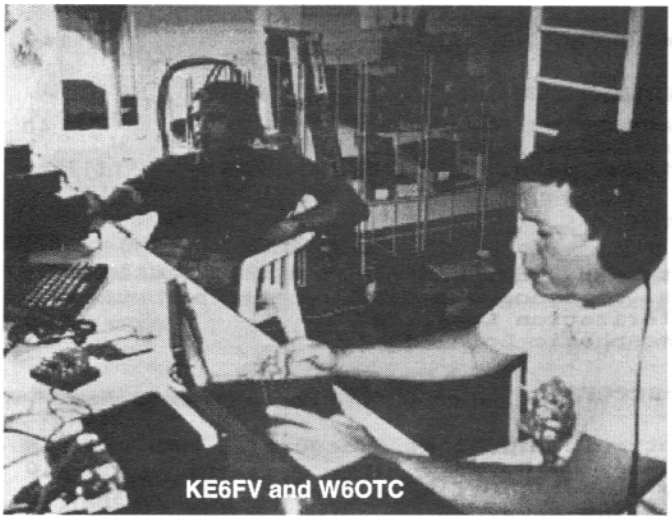
PS Form 3526, October 1994 *(Reverse)*

DIGITAL DXing

The September 1995 Lord Howe Island Expedition - Part II

by Glenn Vinson, W6OTC
#2 Embarcadero Center, #1660 • San Francisco, CA 94111





KE6FV and W6OTC

Station Setup. Steve Stark, KE6FV (AKA "Five Volts"), was in charge of station layout, having made, during the summer, actual CAD diagrams of each station's interconnections. We used his diagrams to check the number of coax interconnections and the number and type of each voltage input (220v, 110v, 12vdc). Steve had already built some very sturdy 220v power "strips" that I had kept from the YK0A trip, and he modified them for our needs on Lord Howe. These "strips," or more accurately, boxes originally had four U.S.-style three-prong 220v outlets. Steve substituted two duplex U.S.-style 110v outlets (which we used as 220v outlets) for two of the 220v outlets and put a standard three-prong Australian male plug on the pigtail. Steve Merchant had previously found an incredible source for foreign electrical connectors, whether male, female, wall, strips, etc.: Panel Components Corporation, Export Designer's Reference & Catalog, available via 800-662-2290 or P. O. Box 115, Oskaloosa, IA 52577. This catalog is a superb reference and component source for anyone going anywhere to operate other than in the U.S. two-blade (or two blades plus ground) zone. Prior to the trip, I ordered several Australian male and female plugs and they made our electrical "strips" very slick and easy to use.

To facilitate other cable interconnections, I made labels for each of the cables of my IC751A-IC2KL-PK232-Top Ten Devices/Dunestar auto-band pass filter station, and Steve Merchant labeled the FT-990-Ameritron-PK-232-Top Ten Devices/Dunestar setup. So far, so good, but here, I made the same mistake that I had made with the Force 12 C4. I did not check all of the functions before leaving home.

First, I had sent the IC751A to Icom in Bellevue, WA for routine alignment early in the year. The unit came back damaged by UPS and I returned it to Icom to replace a broken display. When I received it in July, I connected all of cables with the IC-2KL (having set both the 751 and 2KL for 220v) and with the Top Ten Devices control box. The 2KL and the Top Ten box followed the 751 band switching flawlessly. The 751 heard ok. But, I did not try transmitting with the 751. When I fired it up on Wednesday night, September 20, several JA stations told me my shift was "too wide" or my tones were "no good." After hours of checking for RFI (putting chokes on all relevant cables), switching TNCs, looking for excessive DC voltage drops, adding ground wires, etc., we decided to sleep on the problem. At dawn the next morning, Thursday September 21, I started checking the Molex connector that provides the central interconnect between the Icom gear and all external devices. A ground wire seemed to be questionable; Five Volts fixed it; but the result was the same. Then I checked the 751A manual and found an internal FSK switch for 170hz vs. 850hz. Again, Five Volts attacked the problem, taking off the top of the radio and found that indeed, a technician at Icom must have inadvertently moved the FSK switch from its normal narrow position to wide. Five Volts moved the switch back to 170hz and our Japanese friends who had been monitoring our progress pronounced the problem fixed. I never would have expected this problem to occur, but I should have made some contacts with the rig at home before the trip.

Second, before the trip I had not sent Steve, N4TQO, the cables to test the FT-990 on RTTY. As usual, Murphy proved that anything not actually tested on the air in advance will probably prove problematical. Five Volts and I spent lots of time tracing a fairly straightforward problem that I had not encountered with this same radio in YK.

As noted above, N4TQO, is a well-known CW contester with extensive CQWW CW M/S experience, and, typically, had thoroughly checked the FT-990/Ameritron combination at home before the trip. The FT-990 was been a generous gift by Yaesu to the 1994 YK0A operation, later used on the 3D2CU operation and loaned to us by the YK0A team for this trip. The Ameritron was on loan from veteran CW contester, John Zapisek, K2MM. Since Five Volts and I were having trouble making the FT-990 work properly on RTTY, Steve (as VK9LX) began operation on CW Wednesday evening, September 20, and proceeded to rip off several hundred CW contacts using the TR contesting/DXpedition software for CW. The demand for CW contacts with Lord Howe Island was enormous and remained very large throughout the period of the trip when atmospherics permitted operation. Later, Steve switched to CT because it seemed to work better with his IBM laptop. All CW contacts during this operation were made by Steve as VK9LX, mostly in the first two days of operation. Unfortunately, the combination of antenna work and bad weather QRN severely limited the number of CW contacts after the RTTY contest ended.

The CQWW/IDRA WW RTTY Contest. Our primary purpose on this trip was to work as many stations as possible still needing Lord Howe Island on RTTY and CW (and to the extent possible, on the low bands). Accordingly, we worked RTTY for many hours before the contest. Propagation to JA was very good, as expected; to the U.S., propagation was generally satisfactory, though not excellent; to Europe, propagation was very spotty. Generally, we found that we could hear Europeans (and the U.S. East Coast) better than they could hear us, particularly on 15m and 40m. They generally continued to point their beams away from us long after the band had opened in our direction. This same pattern continued through the period of the contest, resulting in our having mediocre W/VE multipliers and pitifully few European multipliers. Our score of 700,000 or so points may well be enough to win M/S in Oceania, but just shows the difficulty of finding multipliers from the South Pacific. We operated a run station and a multiplier (search and pounce) station throughout the contest but could not work Europe nearly as well as the VK6 stations which were more than 3,000 miles west of us.

WF1B RTTY Software Problems. This article is not meant to dis-

cuss problems with the RTTY software, nor how to overcome its lack of networking support for M/S operations. Most of the problems that we encountered were common among many users and were well documented, sometimes with considerable vigor, after the contest on the Internet digital reflector maintained by WF1B, himself. N4TQO's advice to us during the contest at Lord Howe Island proved very useful: keep a copy of an old version of any contesting software that works, just in case the latest and greatest version does not work at this moment. We ran RTTY v. 2.20c rather than the then-current v.2.20e and even so wished we had brought an even earlier version. When Steve had problems on CW with the TR software, he was able to switch back to an old reliable version of CT, a fairly common fail-safe remedy in the heat of contesting.

I will, however, repeat my own pet priorities for an improvement to the RTTY software: in my view, the RTTY software needs to support networking (preferably via Ethernet rather than via a serial port) in order to join the ranks of the serious contesting software, like CT, used for other modes. RTTY also badly needs scrolling for the receive screen and for the log, as well as rig support for all three major brands of transceivers. Whatever are one's priorities, this is the time for thoughtful users to submit to Ray, WF1B, their careful, documented comments, from actual contesting experience, help him spot needs and problems. He has recently added a second programmer to his team and may now be able to address the wish lists users have been submitting. Ray has done a great job popularizing RTTY contesting and deserves our thanks and constructive reports.

Other Equipment Lessons. Having offered, for better or worse, lots of hardware advice in my previous two articles on DXpeditioning, let me mention some lessons from this trip. First, solid copper for antenna wire is just too heavy to transport on airline trips. Five hundred feet of fourteen gauge stranded copper is so much lighter and cheaper that it is the better choice—but be careful; it requires secure wrapping with vinyl tape for transport and slow, careful uncoiling to prevent kinking. Second, a properly constructed and erected G5RV is an excellent backup and second HF antenna. Do not use a commercial version with a balun. It does not work for reasons that G5RV clearly explains in his articles. Third, buy a wrist rocket and learn how to use it if you will be in an area with tall trees. N4TQO's knowledge of this deceptively simple-looking device was absolutely invaluable and I have asked him to write a sidebar to this article describing its use. Fourth, a good butane soldering iron is an essential tool: it is hotter, more versatile and reliable, especially when working outside, than an AC version. Fifth, pre-soldering PL-259s on 100 foot and 50 foot lengths of coax is a simple but real time-saver. Remember, on a DXpedition, every hour is precious because your departure time is usually fixed. Sixth, an effective lowband operation requires as much preparation and devotion as does any other specialized operation, such as RTTY. Combining several such specialized operations is difficult because the antenna requirements and operator orientation are so different. Make sure your 160 meter matching network and Beverage transformers are in hand well before your departure. Seventh, in addition to the tools I have mentioned in earlier articles, take a wirestripper. This tool is not only a time-saver, but leaves a better, structurally intact wire (especially if it is twisted) than does a knife. Eighth, I still do not have a good recommendation for a mast. My explorations are continuing. Ninth, take 1,000 feet, rather than 500 feet, of 200 lb test, or larger, nylon cord. This cord weighs and costs little, but when putting up wire antennas with a wrist rocket, is used up rapidly. Note also that even this lightweight cord can provide backup for guying the mast for the beam. Lastly, and perhaps obviously, test the entire station thoroughly at home before packing it for the trip.

QSLing Comments from our Manager, W6/G0AZT. On behalf of the VK9L crew, I would like to thank those of you who were thoughtful enough to include a donation, to help towards an expensive trip "down under."

I would like to make one or two observations with regard to QSLing a multi-mode, multi-callsign DXpedition.

Please do not put multi-band, multi-mode requests on the same card. Each callsign has its own logs, and searching both RTTY and CW logs for multiple QSO's takes much longer than if each band/mode request is on a separate card. Let's face it: the average cost of a locally printed QSL card is less than 10 cents each!

It would be appreciated if those of you who worked both VK9LZ (RTTY) AND VK9LX (CW) would send separate envelopes for each callsign. That makes like easier and will ensure a much faster response to your request.

The DIRECT QSL route is to: Eddie Schneider, Box 5194, Richmond, CA 94805 USA. Please include an SAE and return postage. For anyone still needing a card for ZF1RY, P40RY, V2/, VP2M/, C6A/, VP9/ or P4/G0AZT, please send your request to the above address ASAP. Thanks and 73. Eddie, W6/G0AZT

QSL's may also be sent via the BURO to W6OTC.

(Contest Chair - cont'd from page 19)

most likely continue doing so. Participating in a contest is the most fun for him, not making big runs and big scores. Winter time is his main contesting time of the year. With low activity in RTTY mode in his country, he usually CQ's a lot to give as many of us a mult as possible. He is on the high bands from 1600 to 2200 UTC. He then goes to the lower bands until the bands close.

I asked Arpad what his favorite contests were. He says it's hard to choose a favorite contest since all of them have there good points. However, he participates in BARTG and WAE contests the most. Arpad has gained significant achievements in RTTY contesting—two 2nd places in BARTG, 2nd place in CARTG, and a 3rd place in CQWW contest. He has placed in the top 10 several times.

I have worked Arpad many times in contests, he may have 22 year-old equipment, but he has a 1996 signal.. I want to think Arpad for his help in preparing this article.

Next month we will visit with Phil NA4M and we will investigate tuning indicators for the P38.

The next three contests:

WPX —Feb 10-11: 0000 UTC Sat 2400 UTC Sun: 30 of 48 hrs.
BARTG —Mar 16-17: 0200 UTC Sat 0200 UTC Mon: 30 of 48 hrs.
EA —Apr 06-07: 1600 UTC Sat 1600 UTC Sunday: no off times.
(EA contest is a true hard-core DX contest. No points for running your own country. Normally there is a good amount of DX stations for your
DX count, especially if you need EA6, EA8, EA9 on any band.. Give the EA contest a try).

Until next time,

73's de Ron AB5KD

"Remember"
Big antennas high in the sky work better
than little ones close to the ground....

JAY SEZ . . .

Comments & Perspective from around the digital frontier

by Jay Townsend, WS7I
P.O. Box 644 • Spokane, WA 99210-0644 • Internet: jayt@comtch.iea.com

Through a Digital Looking Glass....

I've been doing these columns for about ten years. It seems like forever—not in the sense that I'm tired of it, though. Its just that most of my experiences, about people and places and digital radio has had some relationship to this magazine. During these years, I've come across a lot of interesting people. Authors sometimes elegize about "the road less traveled." Robert Frost wrote verses about the choices that can make all the difference ("But I have miles to go before I sleep...."). And maybe the *Rubaiyat* is more stylish in its phrasing: "The moving finger writes, and, having writ, moves on ....." But time passes and time changes and 1996 brings new beginnings and some new faces to the Digital Journal, it also brings an end to my trip through a digital looking glass.

This then is my final column, tho I hope to visit again from time-to-time. I also will not be doing any of the Marketing for the Digital Journal. We (the IDRA) of course always are looking for some more help. A busy work schedule and increased job responsibilities just limit my time.

Announcing what was created with enthusiasm by Ron, AB5KD, and myself, the second annual Digital Journal World-wide WPX RTTY contest. February 10th and 11th 1996. We have the plaque spongers in place again this year that make this one of the premier digital events. We hope that the second running which finds us one week further in February to avoid the hamfest calendar in Florida a better weekend for the event. Hopefully this will be the final move in dates. The propagation gods need to be with us again this year. Hope to see all of you.

Last year was a rather amazing success with just a few stumbling blocks. We had the contest done in record time and with Ray, WF1B's new software had all of you up and running. Plaques were given out at Dayton in April during the first annual DX & Contesters Dinner on Friday night. This set a standard that few contests in the World can achieve. There is however a down side to these rapid results. First, it depends on YOU the contester to get that log off in the mail, via Internet, or disk to me. It is a burden that unfortunately results in some missing the deadline. For that we apologize, but like all rules and conditions of contest its really just part of the event! Remember that in the United States that using registered mail slows it by up to two months! Also you might note that a recent Priority Mail took 8 days from Spokane to California so I have gone back to just using First Class.

A few hints and kinks for this years event. First, the rules. There have really been no changes. We did add the SWL category and are still looking for a plaque sponsor. We clarified the single transmitted signal by a single operator station as there has been a lot of controversy on that in the various discussions around the world. It is of particular note that we allow FULL PACKETCLUSTER spotting! This was done to keep interest at a peak, as there are lot's of mults in the contest it really should have a minimal impact on the score. This contest is a rate contest and really rewards doing a lot of S & P (search and pounce) that is the best way to maximize the mults. If you have one of those strange calls be sure and get on and work some of the guys and gals.

Ron and I want each of you to know that your log is your responsibility. Part of the contest is going through the log after the contest and in this case, right after in the next few days. You should check each contact and make sure that its what you want. Also you should make sure that the program you are using has added up the points and scored things correctly.

We will be doing a lot of checking this year to make sure that things are done properly. Fixing these little things is part of doing the contest. An example I can give you is from my P40JT log. I look at each multiplier and found that in one case a rather rare mult was entered incorrectly on one band. As I remembered that call it was just a typo. I don't use the "fancy" software so re-type each call in myself. Checking always finds a few things to fix.

The Multi-Multi class is given a lot of clout in the WW RTTY WPX to get more and more stations active in this part of Digital contesting. We put in the 10 minute rule for the Multi-singles to avoid having all of the "big gun" stations do M/S and ignore M/M. Give a couple of your buddies or club members a call and introduce them to M/M contesting! You doing need to have a giant station to do this. We ran just two rigs from Hal, WA7EGA's last year and in fact most of the time it was just one guy operating. A lot of fun this digital contesting and doing it with a group makes for an interesting contest. Just think of all the culinary delights one can prepare. BBQ.....Chinese...Steak...Salmon.

We expect to have a lot more DX activity this year as the word is out about how much fun this format is and the low bands have been very good. With the point structure giving double points to the low bands we should see a bunch more activity on 40 and 80 this year. Europe had a great time last year on these bands and need to check the long path to the West Coast in particular this year!!

As I wind down my activities I will continue to be involved with the WW RTTY WPX and this year I would like to welcome Don, AA5AU, to the log checking staff as well. Don as you all know is getting more involved with the Digital Journal and is a long time contester. Hopefully we will get him real fired up on all of this stuff!

Hopefully, this year a lot more of you will get on during the WW RTTY WPX and give out a mult or two ! Remember that this is a fun contest and is world-wide in nature and we should see some good DX also on for the test. Ray, WF1B, has software that does the contest and there are also some other programs out there that have it all in there format.

Last year I predicted that the M/M class was easy picking for a contest plaque and I want to say that I was right! Bet, this year there will be a bunch more activity. Several of the plaques weren't issued last year.

As you talk to your friends on the bands be sure and fire them

YOUR CALLSIGN OR NAME CAN FLY ON PHASE 3D!

Ron G3AAJ, informs us that AMSAT-UK is sponsoring a program that will allow donors to have their name or callsign engraved onto an aluminum plate and placed on Phase 3D prior to flight. After launch, donors will also be provided with a photograph of the plate installed on 3D, and an engraved certificate or plaque. This arrangement has been agreed to by the Phase 3d Project Team and is available at this date.

This offer is open to those individuals sending at least $250. All methods of payment, including Visa and MasterCard are acceptable, and will be acknowledged with a receipt.

Contact Ron Broadbent, MBE, G3AAJ, 94 Herongate Road, Wanstead Park, London, E12 5EQ England, or FAX 44-0181-989-6741 or Internet<r.broadbent@ee.surrey.ac.uk>

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Esta revista se publica bimestralmente y en una de las páginas iniciales se indica cómo subscribirse. El precio de la subscripción, seis ejemplares anuales que incluyen la **GUIA DE EQUIPOS y ACCESORIOS** (edición de Noviembre/Diciembre), en sobre cerrado, por vía aérea al domicilio del lector, es de US$40.00 para todos los países con exclusión de México y Canadá. En razón de las más bajas tarifas postales, para los dos últimos la subscripción anual cuesta US$20.00. Para los Estados Unidos y Puerto Rico el precio de la subscripción anual es de US$18.00. Los pagos deben hacerse en moneda norteamericana mediante cheque de cuenta bancaria en los Estados Unidos, cheques de viajero, giro postal u orden de pago internacional a nombre de:

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up for the WW RTTY WPX contest which is solely sponsored by the *Digital Journal* the official magazine of the IDRA. Just to avoid any confusion, this contest while inspired by the *CQ* WPX's has nothing to do with *CQ magazine*. Your ***Digital Journal*** is the sole sponsor.

I want to take this opportunity to thank each of our advertisers for there valuable support during 1995 and also want you to recognize each of them. When you place an order for digital equipment you might look through the pages of our **Digital Journal** and see who it is that is supporting you and your magazine. As the now former, marketing director for the DJ, I think its important to note while the IDRA isn't the biggest organization in the world we are the "makers and the shakers in the HF Digital World", it is each of you members that make this organization what it is and what it will be. We are the people who recommend at the local level what the beginners buy. Support those who support you.

As previously promised, I have a supply of 88 Mh torroids in my possession. They are a little bit heavy but I can ship them to you. I know that I had a couple of our Japanese hams that were looking for them. Drop me a note if you want one of these gems! There is no charge other than a little help with the shipping.

This is also the end of the "Work 95 in 95" award program. Which didn't generate all that much activity. We did have a couple of more entries and have shipped off the final awards to them. Stations G3IRM, and VE7SAY were numbers two and three of the finalists. Thanks to all for their participation. I only have one other piece of news and that comes from one of my good friends who does EXpeditions to cold and rare islands. Their plans for 1996 continue and are going ahead on schedule. So we will still perhaps have a chance to work a new one in 1996.

Hope to see each and everyone of you on the bands during 1996. As one of my dear departed friends used to say as he signed off.....dit dit....

73 Jay WS7I

International Digital Radio Association
The 2nd Annual Digital Journal
World-Wide RTTY WPX Contest
Second full weekend in February, **February 10-11, 1996**
Starts: 0000 UTC Saturday - Ends: 2400 UTC Sunday

CONTEST PERIOD:

For Single Operator and Multi-Single only 30 hours of the 48 hour contest period are permitted. Off periods must be a minimum of 60 minutes in length and be clearly marked in the log. Multi-Multi operator stations may operate the full 48 hours.

OBJECTIVE:

The object of the contest is for amateurs around the world to contact as many amateurs in other parts of the world as possible during the contest period using a digital mode. RTTY, Amtor, Pactor, G-tor(tm), and Clover (tm) modes are all encouraged. The most common mode is RTTY.

BANDS:

The 3.5, 7, 14, 21, 28 MHz bands may be used.
No WARC bands.

TYPES OF COMPETITION:

SINGLE OPERATOR (One transmitted signal only allowed on the air at a time)

HIGH POWER: Single operator stations are those at which one person performs all of the operating and logging functions.

LOW POWER: Same as high except that output power shall not exceed 150 watts. Stations in this category will compete with other low-power stations only. (Only for an All Band Entry.)

SINGLE BAND stations are high power only (even if low power used).

MULTI-OPERATOR (All Band operation only) No power classes.

SINGLE TRANSMITTER: Only one transmitter and one band permitted during the same time period (defined as 10 minutes). 10 minutes starts when you transmit on any band.

MULTI-TRANSMITTER: No limit to transmitters, but only one signal and running station allowed per band.

SHORT WAVE LISTENER. SWL. Top Five SWL's will receive certificates. Log must identify both stations heard and give both exchanges..

NOTE: All transmitters must be located within a 500 meter diameter or within property limits of the station licensee's address, whichever is greater. All antennas must be physically connected by wires to the transmitters and receivers. All Single Operator classes can have only ONE signal on the air at a time.

DX PACKET CLUSTERS, AND DX ALERTING ASSISTANCE IS PERMITTED in all classes of operation.

EXCHANGE:

A RST report plus a progressive three-digit contact number starting with 001 for the first contact. (Continue to four digits if past 1000.) Multi-transmitter stations may use separate numbers for each band.

POINTS:

Contacts between stations on different continents are worth three (3) points on 28, 21, and 14 MHZ and six (6) points on 7, and 3.5 MHZ.

Contacts between stations on the same continent but in different countries are worth two (2) points on 28, 21, and 14 MHZ and four (4) points on 7, and 3.5 MHZ.

Contacts between stations in the same country are worth one (1) point on 28, 21, and 14 MHZ and two (2) points on 7, and 3.5 MHZ. ***E.g. 1-2-3 and double points on the low bands.***

MULTIPLIER:

Multiplier is the number of different prefixes worked. A "PREFIX" is counted only once regardless of the number of times the same prefix is worked. No band multipliers.

The letter/number; combination which form the first part of the amateur call will be considered the prefix.

EXAMPLES: N8, W8, WD8, Y22, Y23, HG1, HG19, WB2, WD200, KC2, KC200, OE2, OE25,U3, GB75, ZS66, NG84.

Any difference in the numbering, lettering, or order of same shall constitute a separate prefix. A station operating from a DXCC country different from that indicated by its callsign is required to sign portable, the portable prefix must be an authorized prefix for the country or call area of operation. In case of portable operation, the portable designator would then become the prefix.

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SOFTWARE

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❑ **RTTY by WF1B** - DOS program. For most TNCs. Ultimate contesting tool for novice and expert. Supports all major RTTY contests and Dxpeditions. Features include automatic call sign capture, dupe checking, country & multiplier identification, mouse support and much more. $40.00.

❑ **LOG-EQF** - Complete computer based logging system. Your total control center for on-the-air activity. Features easy logging, data terminal, Packet Cluster (tm), rig control, beam headings, QSL labels, DXCC, WAS and much more. A DOS program which works as a DOS application in Windows. $30.00. On a tight budget? ❑ **LOG-EQF-JR** ($20.00) is identical without provision for radio and TNC interfaces. Registered users also get FILE-EQF, WAS-EQF and DX-EQF utilities for import/export and WAS/DXCC record keeping. By N3EQF.

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❑ **RagChew** - Windows software for HAL PCI 4000 or P 38 cards. Developed by Jim Jennings, KE5HE, to take full advantage of your HAL card. Send/receive RTTY, AMTOR, PACTOR and ASCII all from the same friendly, easy to use screen. Requires Windows 3.0 and DOS 6.0 or higher. Available only with embedded call sign. $30.00.

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❑ **BASIC PACKET RADIO BOOK** - (2nd Edition) - In this edition you will find updated information based on based on readers comments. A chapter on operations via the Internet, Wormholes and LAN-LINK 2.30 documentation. What is packet radio. How to use it. LAN & PBBS information. Using nodes, Packet Clusters, servers. LANLINK manual and evaluation diskette. $29.95.

❑ **RS232C & COM PORTS Booklet** - If you use a computer in conjunction with ham radio, you will find this an invaluable tool to have in your shack. Contains information on COM Ports 1,2,3,4 and RS-232C. $5.00.

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Disk Size _____3.5" _____5.25" **Shipping & handling,** U.S/N.A: $2.50 / DX: $5.00 Total $ _____

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Name_____ Callsign _____ Signature_____

Address _____

EXAMPLE: AB5KD operating from Wake Is. would sign AB5KD/KH9 or KH9/AB5KD, and KH6XXX operating from Ohio would not sign /KH8 which is normally assigned to American Samoa, but could sign /W8, /N8, /K8, etc., or any other prefix authorized for use in the U.S. 8th call district.

Portable designators without numbers will be assigned a zero (0) after the second letter of the designator to form the prefix. WS7I/PA would become PA0. All call without numbers will be assigned a zero (0) after the first two letters to form the prefix.

EXAMPLE: XEFTJW would count as XE0, RAEM would count as RA0, etc. Maritime mobile, mobile, /A, /E, /J, /P, or interim license class identifiers do not count as prefixes.

Special event, commemorative, and other unique prefix stations are encouraged to participate.

SCORING:

Total QSO points from all bands multiplied by the number of different Prefixes worked. A station may be worked once on each band for QSO point credit. Prefix's count just once in the contest.

AWARDS:

Certificates will be awarded to the highest scoring station in each category listed in the rules.

1. In every participating country.

2. In each call area of the U.S., Canada, Australia, and Japan.

3. All scores will be published. However to be eligible for an award, a Single Operator station must show a minimum of 12 hours of operation. Multi-Operator stations must show a minimum of 18 hours. Plaques will be awarded only to serious contest efforts. Decisions of the contest chair are final. A single log is eligible for a single award ONLY. If a log contains more than one band, it will be judged as an all band entry, unless specified otherwise.

See PLAQUE LIST.

LOG INSTRUCTIONS:

All times must be in UTC. All rests must be clearly marked. Single Operator logs must be submitted in chronological order. Multi-Multi logs must be submitted chronologically by band. Multi-Single can be submitted either way. Prefix Multipliers should be entered only the first time they are contacted. They must be clearly designated. Logs must be checked for duplicate contacts, correct points, and prefix multipliers. Duplicate contacts must be shown. An alpha/numeric check list of claimed PREFIX multipliers must be submitted with your log. Unless disk or electronic entry.

Each entry must be accompanied by a Summary Sheet listing all scoring information, the category of competition, and the contestant's name and mailing address. May be electronic.

Contest logs may be submitted on disk, E-mail, or Internet. Logs submitted on disk must contain all required information. (Time, Band, Call, RST, RST & NR Sent, RST & NR Recd, Multiplier, and QSO Points). Files must be in ASCII format and in chronological order for Single Operators and Multi-Single entrants. Multi-Multi entrants must submit logs chronological by band. A sorted multiplier file is also required. Only MS-DOS compatible disks will be accepted (either 5 1/4 or 3 ½ inch). A SASE with QSL Card will get a reply that your log has been received. Internet logs must be unencoded or file attached. E-mail confirmations will be done.

Disqualification: Violations of amateur radio regulations in the country of the contestant, or the rules of the contest, unsportsmanlike conduct, taking credit for excessive duplicate contacts, non-verifiable QSO's or multipliers will be deemed sufficient cause for disqualification. (In-correctly logged calls will be counted as non-verifiable contacts.) An entrant whose log is deemed by the Contest Committee to contain a large number of errors may be disqualified. The contest committee's decisions are final.

DEADLINE: Entries must be postmarked ***no later than thirty (30) days*** after the end of the contest. The World Wide RTTY WPX Contest will always be on the Second (2nd) full weekend of February. Do not use registered mail as this slow delivery. In order to present Plaques it is necessary to score the contest quickly. Send logs via the Internet when Mail Delivery is going to be slow.

Mail Contest Entry and Logs or Disks to:
Jay Townsend, WS7I
Post Office Box 644, Spokane, WA 99210-0644 U.S.A.
Via Internet jayt@comtch.iea.com
For WW RTTY WPX Rules, Log forms or Information contact:
Ron Stailey, AB5KD
504 Dove Haven Dr., Round Rock, Tx. 78664-5926

The WW RTTY WPX was inspired by CQ Magazine but is **NOT** a CQ contest. This contest unlike the CQWW RTTY in September is not jointly sponsored, but is solely a **Digital Journal** event.

TROPHIES, PLAQUES and DONORS:

Multi-Multi
- WORLD ---------PacComm Packet Radio Systems Inc.
- ASIA----------George Clausson, K7WUW
- EUROPE---------Tony Deprato, WA4JQS
- N.AMERICA-----Digital Journal Plaque, N2HOS Editor
- S.AMERICA-----George Wesley, KB2VO

Multi-Single
- WORLD---------Hal Communications, Corp.
- ASIA----------Ted Marks, W2FG
- EUROPE---------Euraf Communications, Benin
- N.AMERICA----Phil Duff, NA4M
- USA----------RTTY by WF1B
- S.AMERICA----IDRA Director's Plaque

Single Operator, All Band (High Power)
- WORLD----------John Troost, TG9VT Memorial (by W2JGR)
- AFRICA---------Dick Stevens, N1RCT
- ASIA----------Jim Colville, WB7AVD
- JAPAN----------IDRA President Plaque, Paul Richter, W4ZB
- EUROPE----------Bill Hellman, NA2M
- N. AMERICA----Hal Blegen, WA7EGA
- CANADA---------Barry Garratt, VE3CDX
- USA----------Irv Hoff W6FFC Memorial (by WA7FAB)
- S. AMERICA-----Pat Cardozo, HH2PK
- OCEANIA---------Shido Takahashi, AH6JF

Single Operator, All Band (Low Power)
- WORLD---------- Rich Lawton, N6GG
- AFRICA--------John Lockhart, WA0VQR
- ASIA----------Chiru, JA3DLE/1
- EUROPE---------Eddie Schneider, W6/G0AZT
- N. AMERICA/CARIBBEAN---Ron Hall, KP2N
- USA--------- Don Hill, AA5AU
- S. AMERICA---Ron Stailey, AB5KD
- OCEANIA------Wayne Matlock, WA6VZI

Single Operator - Single Band
- WORLD 10 MTR-------Robert Chudek, K0RC
- WORLD 15 MTR-------East Washington Amateur Radio Group
- WORLD 20 MTR-------Frank Fallon, N2FF
- WORLD 40 MTR-------Barry Kutner, W2UP
- WORLD 80 MTR-------Tom Arvo, WA8DXD

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CLASSIFIED AD DEPARTMENT

First 30 words $7.50, additional words 10 cents each. Cash with Ad. Deadline for ads is the 5th of the prior month of publication. (Example - Ad arrives by the 5th of December, will appear in the December issue.)

NEWS - NEWS - NEWS - NEWS

Amateur Radio's Newspaper "WORLDRADIO". One year subscription (12 issues) $14.00 for U.S., non U.S. $24.00,2 Year subscription (24 issues) $27.00 U.S., non U.S. $47.00, 3 year subscription (36 issues) $39.00 U.S. non U.S. $69.00, Lifetime subscription $140.00 U.S. non U.S. $240.00. Contact: WORLDRADIO, P.O. BOX 189490, Sacramento, CA 95818

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BACK ISSUES - All Back Issues of the Following: RTTY Digital Journal - ATVQ - A5 SPEC-COM & ATV TODAY. Write for list & prices - SASE - ESF Copy Service, 4011 Clearview Dr., Cedar Falls, IA. 50613 (319) 266-7040

RTTY CONTEST SOFTWARE: This is the program used by WINNERS. RTTY by WF1B is the premier teletype contest software. Supports CQWW, ARRL, SARTG, BARTG contests. New DXpedition mode recently used by AHIA. Supports HAL PCI-3000, PK-232, KAM, MFJ-1278, UTU, AMT-1, and Standard TUs. Online features: Automatic duping, Automatic multiplier identification, Automatic scoring, Mouse support, Break-in buffer, Buffer tags for dynamic custom transmissions, File transfer. Post Contest features: Complete paperwork generation, QSL labels, Statistics. Call (401) 823-RTTY for fact sheet. IBM-PC, $41.95 (US/VE) $44.95 (DX). Specify disk size. Wyvern Technology, 35 Colvintown Road, Coventry, RI 02816-8509

For Sale: HAL RTTY STATION, DS-3100, MSO-3100, ST-6000, All cables and manuals. $350.00 plus shipping. Dick, WA8EZI, 941-575-0745

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PRICE BLOWOUT $19.95. Adapter to use PK232 as a terminal unit with BMK-MULTY software (see our separate ad) for improved performance on all modes. Any version PK232; MBX board not required. While supplies last; this price is far below our cost. Shipping $3.00. Spheretron/Schnedler Systems, P.O. Box 5964, Asheville, North Carolina 28813. Telephone (704) 274-4646.

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Please forward my annual membership in the International Digital Radio Association (**IDRA**) and subscription (12 issues per year) to the ***Digital Journal*** - immediately!

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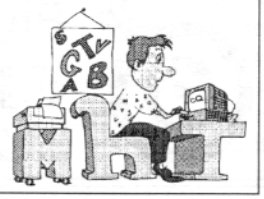
The Last Word

from the editor

by Jim Mortensen, N2HOS
P.O. Box 328 • Indian Rocks Beach, FL 34635 • CIS: 71573,1077



This issue started off with a bang! Not a good bang mind you, but a nice little seasonal message from our very good printer that said, "Happy Holidays, get the Journal in early or wait until next year." Everybody around the world cooperated in meeting the very early deadline. Everybody except my primary computer, which promptly threw a fit. After many hours of thinking, fiddling, reloading Windows, it dawned on me that the hard disk had failed. Toshiba agreed and, at this writing is preparing another 810 Meg drive to replace the seven month old disaster. Fortunately for the Digital Journal and for me, no files were lost because of a fail-safe backup system used around here. Such suspenders-and-belt security measures make the rebuilding job no easier, however. It will take hours and create much stress before it is completed!

I haven't lost a hard drive since the very first hard drives became available for the original Mac's way back in the dark ages. The 10 Meg drive cost $1100, as I recall, and it failed about six months into its useful life. I returned it to the manufacturer, under a full replacement warranty. Within a few weeks, it became apparent that not all was well there, for the phone was disconnected. Take it from me, that is not a good sign. Sure enough, the company went broke and I saw nothing of the drive ever again. I presume some creditor received all the inventory under some court directed settlement, including my drive. I wished them luck at the time! I'm not overly concerned about Toshiba. Hi.

The New Year has arrived and it's contest time. Make a resolution right now that you will hit the big two coming up in the next six weeks. First, the ARRL RTTY Roundup and then, the new giant, the Digital Journal WorldWide WPX! Jay WS7I and Ron AB5KD created an event will all the right buttons and it is fun for everybody. Run some QSO's (you still have time to order WF1B's RTTY software from IDRA). Then submit your log (see Jay's column for all the details) so we know you were there.

Make another resolution to get on the air every week. Don't let the incredibly bad propagation numbers get you down. The contest weekends prove beyond a doubt that long-haul communication in almost any direction is still very possible. This is not the end of the world, it is simply a time when you have to apply a little brain power before you run up the RF power. Study propagation a bit. Listen. Call CQ on the quiet bands. I can almost guarantee you that surprising things will happen.

Finally, add another resolution for good measure. Let's open up 30 meters: Bill NA2M advises that he has been calling on a very open, very quiet frequency looking for Clover QSO's. The frequency? 10133 LSB. The time? 0100GMT. I am going to drop by there from time to time as well. I haven't had any luck yet, either, but the R7 sure sends out a nice signal on the band. Join in.

The DISK LIBRARY delayed its opening for a month. There were several reasons, not the least of which is that Jim WA4ZXA is going to be handling the Software Store shipments instead, starting in late January. But the principal reason traces to Tom WA8DXD, who insists on expanding my technical expertise at a rate slightly faster than my ability to absorb the material. For example, instead of faxing the first layout of the December Digital Journal to me, the usual routine, he sent me a 1.7 Meg file on CompuServe. I immediately protested, claiming I couldn't read the file. He said, "Download Adobe Acrobat from CIS. It's free. Install it and then you can read the file." I did and I could . . . and I was amazed. We may have been the very first to try this, or at least that's the way I felt. The one file contained a complete view of all 32 pages of the magazine. I merely zoomed to the most comfortable resolution and proceeded to edit the Journal in record time.

This program obviously has a bright future and, if Adobe plays it right, Acrobat may become the standard on Internet as well. The secret is that the .PDF files (the suffix used when Acrobat Exchange writes a file to the Printer named Acrobat) keeps its format across platforms, networks, wherever is goes. Thus a Unix workstation views the file and sees exactly the same page as the DOS or Mac computer, regardless of who sent it or the means of transmission.

Acrobat will have a significant impact on the Library. For example, if you want to buy the March 1995 issue of the Digital Journal, you will view it exactly as it was printed. Or, if you want to buy, and you should, a compilation of the RTTY TUNING series (by Bill K9GWT), the same phenomenon applies. Acrobat is clearly the finest software development in a long time and can be downloaded free from Adobe's Internet page, CompuServe and most of the other services. Look for it on the IDRA page or buy it from the library (it will also come free with certain purchases).

While it is early in the game, I can say that these products will be shipping in PDF format soon (some in early February). First, the K9GWT series mentioned above. The price-$10 (US) shipped anywhere, and it includes the Acrobat viewer. Second, each month of the 1995 Digital Journal will be available about March 1, 1996. Each month fills a 3 ½ inch floppy disk. The price will be $5 (US) for any one month, any three for $15, any six for $25, all twelve for $45. The multiple orders include the Acrobat viewer at no charge. Add $2.50 for shipping to all orders.

Finally, one other product will be available in January and it might just create a little interest. Express 3.02 should be ready for release during this month. The file will be free if downloaded from our Web Page, but if you want the new release in a hard format, it will be available for $5 (including shipping) to all registered owners of Express. This file will not be of any use to those who are not current owners of the software. Get your orders in now.

Good stuff in the pipeline, including several more installments of the DSP primer begun by Doug KF4KL found in

this issue. Don't miss a word of it! Glenn W6OTC takes a look at RITTY. Later, KB1JY and colleagues will produce a major report on the data throughput. Very carefully structured, it involves completelyautomatic measurement. The first phase measures AMTOR, Pactor and G-Tor. Watch for this one!

Red Free W3TFG writes about problems with one production lot of AEA's PK-900. Seems they produced some where the cable leads did not match the manual's instructions. Apparently a supplier slipped up. Anyway, AEA has tried to contact all buyers of this series. If you have troubles like this and haven't heard from AEA, better give their Tech Support a call. Thanks, Red.

Back to rule number one! Back in November a big chunk of this space was devoted to the subject of helping beginners get acquainted with the digital modes. There is a final chapter to the story. It, like all the rest, came via E-mail, and I want to share it with you.

"I just thought that I'd let you know that I'm doing just fine with my HAL P-38. I've had good luck with RTTY, AMTOR, and PACTOR with the little that I have tried them. The 20 and 40 meter bands have been pretty dead most of the time when I get to turn on the rig late at night. I've been busy with other stuff on weekends. Nonetheless, I am very pleased with the P-38 and really appreciate the help you gave me. The best band at my QTH for the digital modes is 20 meters. Unfortunately, that band has been going to bed very early most of the time. I don't hear much digital stuff on 40 meters at my QTH even when the band is open. I haven't had a chance to try CLOVER yet. Than comes next when I get the time.

I got a kick out of reading about myself in your column in the November Digital Journal. All it takes is for someone to outline the basics when getting started with the digital modes, but without that it can be kind of puzzling. It's like learning to drive a car. You just can't do it by reading a book if you've never even been in a car. I know that the questions I asked you were VERY basic. However, the answers you gave were all I needed. Maybe a series of beginner's lessons in CQ or QST would help other "newbies" get started. (Publishing it in the Digital Journal probably wouldn't work as well because most people probably don't subscribe to the Digital Journal until they are up and running on the digital modes. I probably was an exception in that regard. I really like the tuning indicator on the P-38 software. That really helps a lot.

Again, thanks for your help. I hope to work you on the bands some day. Oh, by the way, I am having trouble with noise generated by my computer. I am putting Radio Shack chokes on all the cables coming out of the computer."

What else can I say? Except that a little time spent with a beginner pays a very large dividend. Try it next time, either on the air, on E-mail or next door, or across town, or at the hamfest. But, try it. You won't regret the investment!

(By the way, he raises a good point. There hasn't been a lot of talk about computer noise of late. Have the computers improved, does everybody ground theirs ((really?)), is there a new or better way? Let's hear from some of you who have lived through the problem and the solution.)

DAYTON '96

May 17, 18, 19 : Mark your calendar today!

by Dale Sinner, W6IWO - Hamvention Coordinator
1904 Carolton Lane • Fallbrook, CA 92028-4614

It's time once again to make your plans for this annual event. This year*s extravaganza will be more exciting than ever before. You won't want to miss this year. However, the first thing you MUST do is secure a room. If you wait until the last minute they will all be gone. We will again be staying at the Radisson Inn on Needmore Rd and I-75. The rooms will be $86.00 per night. Most rooms have two double beds in case you wish to share with someone. The rooms will require a deposit but you need not send any money until I advise you to do so. Don't delay, call, FAX, or Compuserve me today with your room request. If you wish to reserve a room for someone else, be sure to indicate who that person is. I need to know your name, address. phone/FAX number and how many rooms you are requesting so that I can get in touch with you. That is all I need at this time.

Well, you ask, what do we have planned for you? Nothing less than a few spectacular speakers and few fantastic side events. We'll have speakers at the hotel and at the Digital Digest forum over at the arena where the Hamvention is held. Since the Dayton people can't supply us with enough conference rooms, we have made arrangements at our hotel to hold these additional sessions there. This way you are assured to have the best of all worlds. Also at the hotel, you will enjoy a more relaxed atmosphere. There will not be all the noise that one encounters at the arena. People will not be coming and going, slamming doors. etc. You'll also get more opportunity to ask questions of each speaker. Hey, we'll even have coffee for your sleepy eyes. I'll have more details for you as the time approaches. It's for sure you will not be disappointed with the programs the IDRA has planned. Those of you who were there last year will no doubt remember how smoothly the bus service ran to and from the Hamvention. 'I'hanks to the hotel and the Dayton Convention Bureau, we had excellent service and we can count on that same service again this time.

We also plan to have two special dinners arranged for you to attend. The first dinner will be the DX and Contesters dinner that will he hosted by Ron Stailey, AK5KD. Ron will have more on this dinner as the time approaches. He will, of course, have an outstanding program to go along with a super meal. Watch for details in Ron's column. The second dinner will be our annual dinner that has been popular for many, many years. I will again be your emcee and can tell you now that the IDRA has put together a super colossal. extraordinary, magnificent, tremendously fantastic program for us all. This is a must dinner to attend. Watch for details about this dinner in my announcements which will occur each month.

Again, the IDRA will sponsor a hospitality suite both Friday and Saturday nights. You'll enjoy both evenings as much as the Hamvention. Just think, a chance to meet Hams you have talked to on the air or maybe someone who is a famous Dxer. Many of our Board members will be there to listen to your comments or criticisms as well. And, it's all free, compliments of the IDRA,

Over at the arena, in addition to having our Digital Digest forum, the IDRA will have a booth again this year. Here's a place for you to stop by for a visit or to renew your membership. You'll find journal staff members and Board members here also. No doubt this will be the meeting place for all members. Stop by for an eyeball

If you have been a ham for many years like I have, then you know that no other group has ever arranged so many events for you to ettend. You're guaranteed to be busy the entire time you are at Dayton. So don't hesitate, secure your room today for this really great event. It only comes around once a year so make your plans today! Call or send me a fax at (619) 723-3838 or CompuServe 73074,435.

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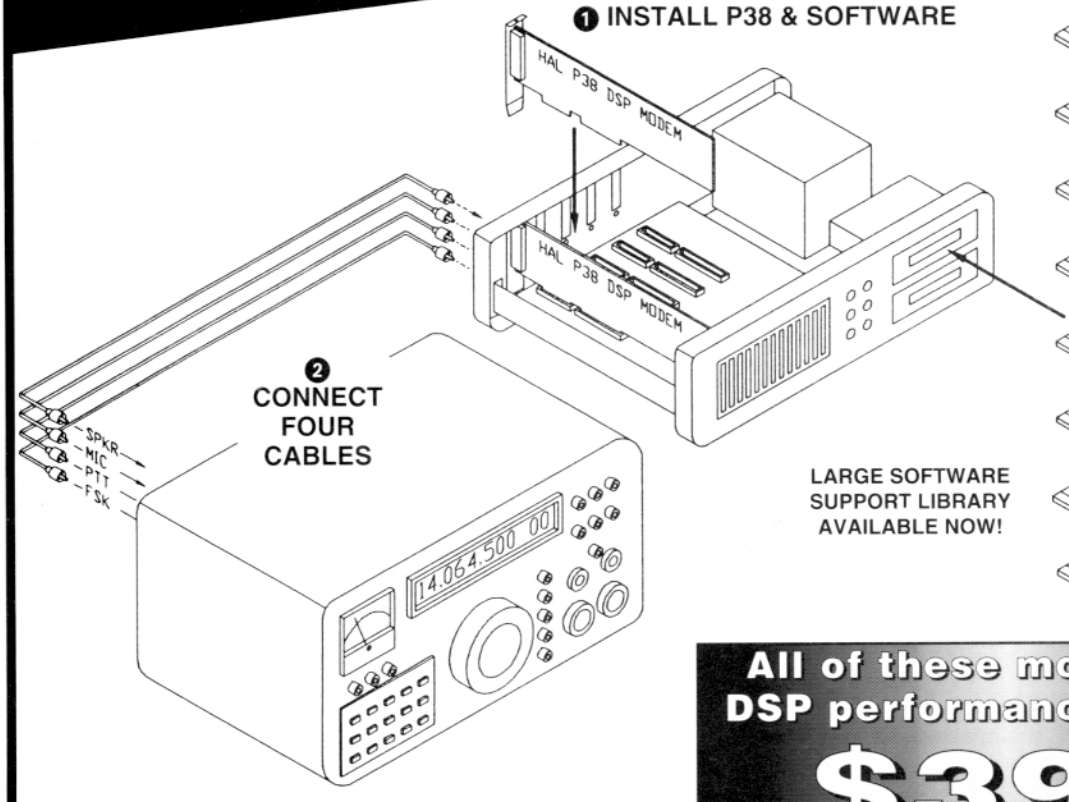
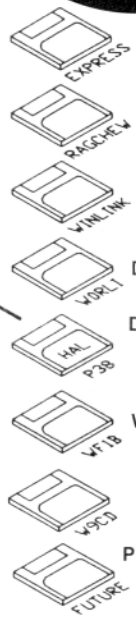


❷ CONNECT FOUR CABLES

❸ WORK THE DIGITAL WORLD



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