DIGITAL Journal

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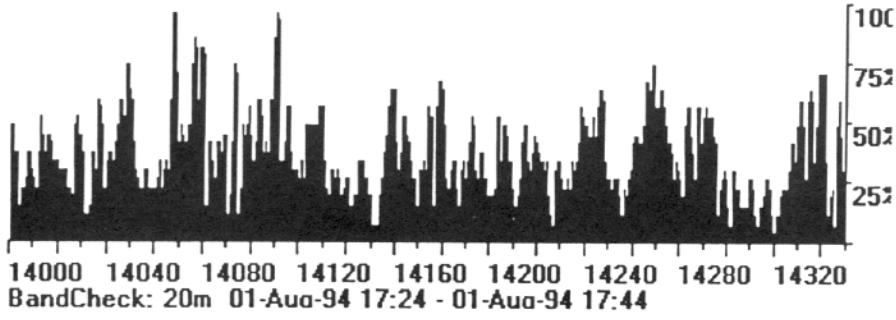
IN THIS ISSUE

IS THIS FREQUENCY IN USE??



It obviously is on most of the band according to our latest software product, even in this scaled-down view. BandCheck/BandChart was devised for and contributed to the ADRS by one of our directors Peter TY1PS (of Express fame). See "What's Going On Out There" for further details. Read the October issue to find out how to get your own copy.

POSTMASTER

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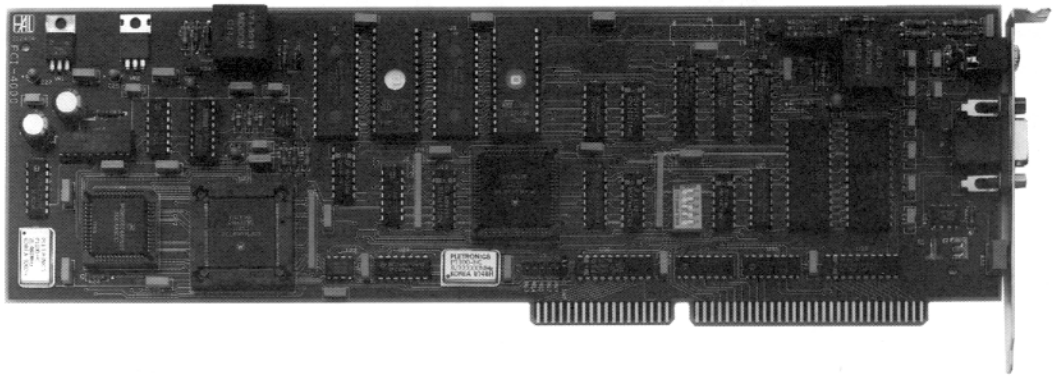

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HITS & MISSES

Dale Sinner, W6IWO
Use It or Lose It!

U.S. government picks up millions of dollars on frequency sale.

You have probably read recently about the sale of frequencies that the FCC has auctioned off to the private sector. The bids were far beyond anything the FCC had anticipated. In fact, millions of dollars over their estimates. A recent newspaper article quoted the government gain in the area of 1 billion dollars. No doubt our Senators and Congressional people will be watching this action very closely. I hope you read between the lines here. If frequencies are in such demand and worth such huge amounts of money, what's next, we might wonder.

I'm concerned that maybe one day these independent sources are going to be looking at the amateur service with the thought of maybe reducing are frequency spectrum. On the other hand, what if the government should decide one day to start charging Amateurs a yearly licensing fee. A little simple mathematics here would indicate that *Big Brother* could pick up a couple of billion dollars every year.

Oh, you're not worried! ... Okay, maybe not today but, look-out big business is just around the corner watching everyone and looking everywhere for frequencies. Besides, don't forget the recent loss in the 220 Mhz band. Also keep in mind that in some countries around the world it is common to charge a yearly licensing fee to Amateurs.

Please don't think that I'm an alarmist. My only intent is to alert you that these are important issues everyone must keep in mind. The old clique *"Use it or lose it"* that has been applied to our frequencies so many times still holds true. At all times we must demonstrate the usefulness of our fraternity and be ever alert to any invasion thereof. Elsewhere in this issue you will be reading about our band usage and mode usage and also about frequency sharing. Please read them all carefully, the future of ham radio could be at stake here.

What Are YOU Doing Tomorrow?

I have not been on the air enough lately and I admit it. How about you? However, I'm going to make a dedicated effort from now on to spend more time on the air. I'm missing a lot of fun; but no more. I will be keyboarding on RTTY, AMTOR, PACTOR and Clover. I'm looking forward to having some fun again. In the past I always found reasons for not getting on the air. Now that is coming to a screeching halt. Watch for W6IWO calling CQ. Let's get together on the air and exchange some ideas and thoughts and have some fun for a change. Work is work and it will always be there waiting. Take time out and make space for some digital fun.

If we all take some time to get on the air:

- we will all become better operators because the bands will be more crowded,
- we'll have to do a sharper job of tuning,
- we'll be listening better and more before transmitting,
- we will be helping to establish areas where different modes will congregate,
- and we will be demonstrating our usefulness.

I see all kinds of good things happening if we would all make an effort to spend more time on the air.

Presently we have many problems with band usage that have stemmed from lack of use to overuse. But, if you have read between the lines of what I have written then you can see that by spending more time on the air, we can work out our problems. We will, in the process, become better operators. We will be utilizing our bands more and letting outsiders know that we are an active force to be faced should they get some strange ideas about attacking our frequencies. So, how about it, give me a call and let's communicate the digital way.

16 PAGER

Your last issue was a special edition, sponsored by the advertisers. It came to you FREE. It did not affect your renewal date. Some of you may not have noticed our reference to this special edition in past issues and we did make a big deal out of it in the last regular issue. Our fault! We hope you liked it and will let the advertisers know your feelings.

73 - See you in the keyboarding pileups.

de **Dale, W6IWO** ■

THE PRESIDENT'S CORNER

Warren Sinsheimer, W2NRE

On June 23, 1994 the FCC issued a Notice of Proposed Rule Making relating to automatic and semi-automatic operations of digital signals at HF. My purpose here is to help members understand the Notice, examine its background and inform members how they can comment to the FCC if they wish.

Early in 1993 the ARRL filed a petition with the FCC in which they sought a change in Part 97 of the Commission's regulations to permit fully automatic digital operation at HF within certain designated subbands. Such automatic operations had been permitted for a limited number of stations as designated by the ARRL. They were authorized by a Special Temporary Authority (STA) granted by the FCC and permitted HF automatic operation for the packet radio protocol only. The Commission reasoned that because packet had the ability to "test" the frequency before transmission the potential for interference caused by automatic operation was lessened.

The ARRL's Digital Committee studied the question at great length and recommended to the Board of the ARRL that automatically controlled stations be required to operate within designated subbands. The Committee also recommended that digital stations operating in a semi-automatic mode be authorized as well. The ARRL Board declined to follow the advice of its Digital Committee and, as a result, the ARRL petition was silent on the subject of semi-automatic operation. ADRS requested the ARRL to amend its petition to include semi-automatic. Once again the ARRL declined.

Consequently, the ADRS filed its own petition with the FCC. We sought to clarify the situation with respect to semi-automatic operation. The ADRS requested the FCC to authorize semi-automatic operations at HF on any frequency on which digital communication is authorized. Our petition also requested that the maximum bandwidth for semi-automatic operation be limited to 500 Hz. At the same time we commented on the ARRL's petition and informed the Commission that the ADRS did not take a position with respect to fully automatic control of digital stations. But, in the event the Commission granted digtal stations the right to operate automatically, such automatic operations should be limited to specific subbands. We reasoned that automatic control of digital stations would cause havoc on the HF bands unless they were placed in subbands. And that other users should be forewarned that these subbands contained automatically controlled stations. Thus they could avoid these frequencies if they wished.

The FCC has now issued the Notice Of Proposed Rule Making with respect to both petitions. The Notice means that the FCC intends to amend Part 97 to permit fully automatic digital operations in the subbands listed in the notice (see box on page 24 of this issue). At the same time, the FCC proposes to allow semi-automatic operation (including the stated subbands) wherever digital operation is permitted. The ADRS Board believes this to be a fair and favorable outcome for all. The automatic stations will have a small slice of each band where they can conduct their operations. Others will be put on notice that if they use those subbands, they are likely to experience interference at any time from the automatic stations. Please note that the subband frequencies chosen agree with those approved by the IARU Region 2 prior to the filing of the petition. Thus, all of Region 2 should relocate to these frequencies.

Semi-automatic operation, which has been in existence for more than thiry years, will be permitted to continue as before. Fortunately the uncertainty surrounding such operations will be clarified. It is important to note that the FCC adopted the ADRS proposal to limit the bandwidth used by such semi-automatic operations to 500 Hz.

There are those who believe that semi-automatic stations are responsible for some of the reported interference with keyboard-to-keyboard operations. This matter was considered at great length by the ADRS Board. They had extensive consultation with a number of technical experts, including members of the ARRL Digital Committee. They concluded that the potential for interference caused by semi-automatic stations was no greater than keyboard-to-keyboard operation, provided that the "listen first, then transmit" rule was followed by all parties. One station has to initiate the contact by interrogating the semi-automatic operation. The calling station must be under the control of a licensed amateur and that operator must listen before transmitting to make certain the frequency is clear. If all follow the basic rules and avoid intentional interference, there should be no difference between the interference potential of a keyboarder making a call to a BBS or to another manned station. In both cases a control operator is present and the rules are identical and the results should be the same.

These rules will not become effective until after the period for comments and reply have expired. The deadline for comments is October 1, 1994 and the period for reply by the proponents expires on November 1, 1994. Anyone may comment on these rule changes. There are two methods of commenting, either formal or informal. Formal comments must be filed with an original and four copies (plus an additional five copies if the commentor wishes each Commissioner to have a copy). To comment formally, the comments must conform to the provisions of section 1.49 of Volume 47 of the Code of Federal Regulations. Informal comments may be made in any form. An original and a copy must be filed with the Commission. In either case the comments should be forwarded to :

The Secretary

Federal Communications Commission

1919 M Street, NW

Washington, DC 20554

The Board of ADRS meets in late October. An analysis of current band activity indicates that some changes might be in order. This is a time when all user groups, new modes and old, must examine their operation and adapt to the needs of the digital community. Thus, we intend to discuss whether to recommend the relocation of some semi-automatic operations. This is an important issue. Any input from the membership will help in these deliberations. Please contact any one of the directors if you wish to express a point-of-view. ADRS serves the need of the digital community and we appreciate hearing from you.

73 de **Warren W2NRE** ■

Mike Candy KI7FX has long been a loyal and valued contributor to the Journal. But he now disappears as a regular columnist. He is literally running out on us. Mike chose this time to retire from a down-sizing Air Force. Mike and his wife then decided to do something special before beginning the next career in Wisconsin. Thus they will be travelling around the USA for a number of months enjoying the sights and sounds they have not had a chance to experience before. But fear not, we will be hearing from him from time to time. Mike, who will not have a station with him on the trip, will be in touch. How? With Internet of course. He has promised to report on such things as the ARRL Digital Conference in August, keeping in touch with the world when on the road, interesting observations, etc. We look forward to hearing from him soon. In the meantime, *bon voyage* Mike!

WHAT'S GOING ON OUT THERE???

(Cast (in order of appearance): WS7I, JA3BN, WA3KZK, G0ARF, ZL2UT, W2FG, NA2M, W2JGR

A Multi-country survey of band conditions, past and current practices and attitudes toward new users and new modes shows that there is ...

Chaos, or even worse, according to some correspondents. The cause? Pick among the options: a)QRM by CW operators b) automatic BBS stations, particularly but not exclusively HF Packet c) beginners who don't know where to call CQ d) old-timers who think they own a frequency e) pactor practitioners who fail to tune their transmitters f) beginners who don't know anything g) semi-automatic BBS stations h) stations calling semi-automatic stations or I) operators who transmit before they listen.

A kernel of truth exists in each and every charge. No doubt about that, yet each is wide of the mark for they merely skim the edges of the underlying problem. Basic change created this troublesome environment . . . and only basic change in our habits stands a chance of improving on-air conditions.

Two factors dominate band activity today (aside from the woefully poor propagation). First and foremost, six modes now populate the airwaves in roughly the same amount of space used by three modes a mere three years ago. Second, we who for years seemingly held "squatter's rights" to certain segments of the digital bands now see a horde of newcomers searching for a place in our backyard. If ever there was a perfect recipe for frustration, irritation and outrage, this is the one! We document our trials and tribulations and relate them to our neighbors and friends on the air. Then, suffering from an acute sense of myopia, we assume our little mess on 14086 is "typical" and therefore must be the true worldwide situation.

Maybe. Maybe not. Lacking either manpower or funds necessary to set up a global monitoring service to measure the facts, we have done the next best thing. The Journal called upon a group of seasoned observers around the world and ask them to spend some of their valuable time listening . . . listening to and watching what is going on in their back yard. Each was asked to comment on the impact the changes have had on their own method of operation. And each was ask their opinion regarding solutions. In the following pages we will present their comments and then begin to merge their comments into a workable whole.

We begin at the beginning. The depth of the problem escapes us without knowledge of conditions at the starting point. We can't tell where we are going without knowing where we were. Looking back over the forty-plus years of digital radio history makes little sense, but touring through the past propagation cycle produces a fascinating study of digital events, all of which bear heavily on us today. Jay WS7I produced the following treatise and effectively answers the question . . .. **where were we???**

"Only contesting and DX-ing on RTTY survive and they grow larger and larger."

"What are the Gentlemen's agreements of old . . . and what's left of them" is important to this issue of the **Digital Journal**. We've seen agreements change just like the name of our magazine. Just last evening, I dug through a bunch of old **RTTY Journals** dating back to 1985, looking for CQWW contest information. That's about one sun spot cycle ago. What were things like just eight years ago on the digital bands?

In 1986 we had RTTY, some AMTOR, a bit of Packet. Everything seemed to fit pretty well in our bands. The major band has always been 20 meters. When the sunspot cycle nears the bottom, it is the only band with "good" conditions. Let's look at digital as it was then on 20 meters. 14.070-14.079 was *AMTOR's realm* with 14.075 a calling frequency. These "chirpers" successfully carved out a niche on the bottom edge of the band. 14.080-14.099.5 was *RTTY territory*. 14.100 had propagation beacons and 14.101 to 14.109 was *Packet country*. Most of us were even on frequency in those days. FSK was the rule and Mark and Space meant something. LSB was how Packet guys or "new" guys read their frequency.

We had mailboxes and autostart on RTTY and nearly every evening you could find guys rag chewing on RTTY. Hal WA7EGA churned out 20-30 minutes of 45 baud RTTY each transmission. Hal had his particular style and wit. Carl K6WZ would drop by and say hello as he patiently waited for another DX station to snag. The biggest bother was the occasional strange mailbox that showed up on our bands, running beacons and making "a mess of the band." The famous and infamous BOFFIN's Net would fire up each evening with Don AA5AU, Eddie G0AZT and Barb N4LIH with others dropping in and out.

DX was common and you could have long and interesting conversations with friends. Ted HC5K would show up nearly every Sunday and look for his friends from around the world and make many new ones in the process. Glad I was one.

The Agreements. I think the main agreement was to enjoy yourself. Most did, but then came the changes. First, Packet dropped down below 14.100 into the RTTY spectrum, seeking an "easy" place from which to operate. Most of these were BBS operators doing forwarding, often in an unattended mode. Oh, the battles they did rage! Vicious RTTY guys with kilowatts worth of RY's, versus the never-ending and relentless packets which kept pouring forth from the unattended or uncaring Packet stations. Guess what? Packet won.

As AMTOR grew and expanded into BBS operation, came the second phase. APLINK, PAMS, complete with scanning and calling, brought great pressure on the small piece of spectrum from 14.070-14.080. The term **keyboarders** was coined as they sought their own space in the band.

RTTY contesting became a real event in 1987. First, CQ Magazine with co-sponsor RTTY Journal founded the September CQWW RTTY Contest in 1987. Two years later, from out of my living room, came another major contest, the ARRL's RTTY Roundup. Finally, in February 1995, we will see the latest entry, our new ADRS WPX contest.

Contesting just beats up the bands and takes over during certain weekends of the year. There are now many, many contests and most of the digital guys join in and enter. During a peak period you find contesters from 14.060 to 14.109. Those sly guys on the edges sometimes get an edge.

Another big change was the tremendous influx into RTTY DX-ing. It has now spread into all of the digital modes. From a pursuit of just a few of the "old-timers" came a flood of the major "honor roll" guys looking for another award. To RTTY they came and stayed. Creation of the RTTY Honor Roll has demonstrated just how important and large this change

has been. DX-ers need spectrum, clear of interference, to be able to listen to the weak stations they seek.

One big change occurred when the digital amateurs stood as a group to block RM 7214, the worst idea in many years. Thanks to a bunch of guys we weathered an attempt to channelize our bands and put automatic operation everywhere. Finally, the digital guys had a voice in their own bands. From these ashes came changes to the agreements. From the ADRS came leadership and a better understanding of automatic and semi-automatic operations and the blend of contesters and DX-ers. Most importantly came the innovative and technical developments that brought new beginnings to digital radio.

Pactor, Clover, compression and now G-TOR entered the digital arena. With these new modes came a flood of changes. RTTY is dying as a chat mode. Not many conversations take place these days on the bands. You are about as likely to see the BOFFIN's Net on Pactor as AMTOR. But it's now rare to hear them on RTTY. Only contesting and DX-ing on RTTY survive and they grow larger and larger.

New modes, some with wider shifts are now the reality. Many of them can't be copied by our older terminal units. Even the "old guys" are beginning to change. Why just today, Hal WA7EGA inquired at lunch about the price of the new multi-mode Clover board. He must want Pactor and Clover.

Autostart guys from 3.712.5 are talking about Pactor on 10 Mhz, and linking them to RTTY. The FCC's Rule Making Proposal issued in June 1994 will create further changes. Look for a large growth in KA-Nodes and also look for a lot of linked HF PacketCluster systems. Yes, changes are with us. Stop and think for a moment of what Peter TY1PS' Express software does now, and what might be in our multi-media future.

Digital is growing and will take up more and more of the shared CW and Digital subbands. Just like Packet spread, now Pactor is spreading. Clover now has a spot. G-TOR needs one. Pactor II will find a place.

Those who use their modes and need the most space will grow and continue to occupy more band space. I can only hope that the agreement to **have fun** remains. What ever the utilization of the bands, the most important thing to remember is that **a band that is full is a band that is ours . . . to enjoy**. 73 de Jay WS7I . . . running Clover, Pactor G-TOR and still chasing DX and contesting on RTTY!

Jay's scenario builds a solid background against which we assess current events. Others report similar stories of the changes over the past few years. Some variation exists because the state of digital activity varies from area to area, but taken together, however, they indicate ... **what has happened out there???**

"Aside from the potential conflict with CW at band's edge, Taka worries most about space for the keyboarders of the world."

Taka JA3BN takes us a major step further and documents his inter-modal shifts. This fascinating table (extracted from data covering 7320 QSO's), while unique to his operation, demonstrates clearly the dramatic shifts of the recent past. Taka is the complete digital operator, by the way. After becoming a ham in 1953 he made his first RTTY contact with JA3PJL in 1983, AMTOR with W4TNX in 1988, Pactor with JA3NLT in 1992 and Clover with W6IWR in 1993. His first G-TOR contact should take place in August 1994. And while business demands and propagation have limited his 1993-94 activity, as you can see from the estimate below, he will be right back in there when next year arrives!

Taka utilizes all modes. By his own admission, he has a shack full of TNC's including PK232MBX, HAL PCI-4000/M, KAM Plus, DSP-2232 and an old Theta-777. And that is why these numbers deserve a certain credibility. Since it takes two to QSO, Taka could but respond to whoever was on the air regardless of mode. Thus these numbers yield an interesting and probably quite accurate portrayal of enormous change and the rise and fall of the individual digital modes.

JA3BN LOG SUMMARY

MODE	1987	1989	1991	1993	1995e
RTTY	755	534	196	86	50
AMTOR	0	213	584	108	200
PACTOR	0	0	0	93	500
CLOVER	0	0	0	35	50
TOTAL	755	747	780	322	800

Change creates stress. In Clover, for example, he worked DK4ZC and I3FWY around 14.084 initially (the RTTY numbers above suggest that it might not be the worst idea in the world). But, DX RTTY is not dead yet! So they and most other Clover operators cleared out of there and moved down the band and started to cluster around 14.066 LSB (see calling frequency information later in this report). Taka is a bit concerned now about the conflict with CW even though, as he points out, Clover operators are not yet too numerous in Japan.

HF digital activity in Japan lags despite its position as the world's second largest amateur population. There are several reasons for this, not the least of which is the difficult keyboard translation challenge. But Taka's TNC inventory points to part of the problem. There is but one TNC brand made in Japan, largely because the IBM PC "standard", adopted virtually every where in the world, has only recently made significant progress there. The number one brand had resisted the move since the beginning of the PC revolution. Thus, the pioneer digital pioneers like JA1ACB, JH1BIH and JA1JDD had to import both computers and TNC's, struggle with the language barrier . . . all without any local support. Pioneers indeed!

Aside from the potential conflict with CW at the lower end of the digital area, Taka worries most about space for the keyboarders of the world. He bemoans the automatic BBS operators in the 14070-80 space who break in on top of any signal in their path. And, in a land where only JA5TX operates an HF BBS, these signals come from elsewhere moving the " . . . *same information around and around the world.*"

On his list of concerns is the need for speed. "*I wonder how many keyboarders really want or need anything over 100 baud.*" While he feels the need to have both AMTOR and Pactor as basic QSO modes he lacks enthusiasm at this time for 2-300 baud keyboard modes. Perhaps they will go the way of keyboard HF Packet, surmises Taka. He excludes the multi-media world of Clover/Express in that remark. This is the new frontier. His experience elates him and he hopes the different world of compressed and digitized voice, pictures and binary files receives a full exploration in the months and years ahead.

The Japanese snapshot is no more a complete image of the digital world's scenario than is the one taken in any other country of the world. But, if we go to Delaware and listen to another meticulous record keeper, we find a confirming pattern.

And a similar shift in frequencies as well as we get aboard the . . . . **Deleware express.**

"It helps that I have always logged the exact (well fairly exact) frequency of each QSO."

Crawford WA3ZKZ begins by the observation "In 1972 if I wanted a RTTY QSO, my best choice of frequency was probably around 14.090. In 1994 if I want a RTTY QSO it looks as if my best choice of frequency is about 14.088." So, he asks, "have things really changed much?" Typical understatement, for he then proceeds to demonstrate that changes have indeed taken place. Another careful logger, Crawford also notes the frequency of the QSO. (While there is space for the data in many log forms and computer programs, I'd wager few fill it in). ". . .I always logged the exact frequency (well fairly exact) of each QSO," he says. And then dug into the data base and began to make comparisons. There were some interesting shifts indeed. Reading the old paper logs might have been difficult for others, but he swears he can read his own writing! Let's extract the 20 meter data and make the point that changes have indeed taken place. Packet's push down into the RTTY band and ARQ's push upward is quite evident in the data. For example in the years 1984-1989, the highest logged RTTY QSO was on 14.101. Through the end of 1993 since then, the highest frequency used has been 14.094. The bottom range has moved up as well. In the earlier period the lowest logged frequency was 14.078, and in 1990-93 it had moved up to 14.081. In effect, by his log the RTTY world has been cut from a 23 Khz range to a mere thirteen, and today it is probably somewhat less.

The mode shift here has been somewhat less that Taka's even though he, too has most of the modes is his inventory. Let's look at 20 meters again.

	1980-85	1986-93
RTTY	608	578
ARQ	32	451

After looking at his data, Crawford concludes that modes cluster rather rapidly. RTTY adjusted to Packet to the upside and ARQ to the downside. It now appears Pactor prefers to sit from 14.074 to 14.080. AMTOR moved down to 14.069-14.074. "Even Clover and G-TOR appear to have some preferred slots. Maybe it will take a few years to clarify everything, or is the pace of progress now so fast that patterns will get muddier and muddier for a while until the new champion modes emerge? I don't know but we will soon find out."

Neither snapshot delivers an accurate image of the conditions around the globe because habits, tradition and propagation create an endless variety. So let's get back on our island-hopping tour and find out . . .**About England.**

"Band planning should form part of all license examinations and thereby emphasize the importance of compliance."

Bob G0ARF, the owner of a callsign I have seen more times in more contests than most, brings us an interesting report from the UK. He is the news editor of the weekly (GB2ATG) BARTG news transmissions, takes time to earn a living and still was generous enough to take a vigorous look at the bands. Devoting the second half of June to this project, Bob found that only three of the HF bands (80/40/20) were usable during this test because of dismal propagation.

IARU Region 1 maintains advisory band plans for the digital modes. Digimodes include AMTOR, Pactor, Clover, ASCII, RTTY and Packet. G-TOR's introduction followed the last published band plan recommendations. Using the 20 meter band as an example, the suggested allocation comes as no great surprise to the rest of the world. 14.070-14.112 (all frequencies are Mark) is shared by digimodes and CW. Within that space, 14.089-14.099 is labeled Packet preferred (a term, I presume is the same as Region 2's Packet priority). 14.099-14.101 is exclusively for beacons as in all other regions of the world. 14.101-14.112 is also Packet preferred. While these frequencies are not a perfect match for those agreed to in Region 1, there are surely no barriers to digital communication of any kind between the UK and other parts of the world.

Listening to the bands showed something less than a fanatic attachment to these voluntary allocations, however. For example: "3.5 Mhz - - RTTY is well disciplined. Several AMTOR mailboxes are in constant use and there is regular AMTOR, Pactor and G-TOR ARQ activity. The ARQ modes tend to interfere with each other but the major source of abuse comes from Packet stations working well below 3.590. The worst offenders work down as low as 3.587.5 on the AMTOR mail box frequency."

"7.0 Mhz -- The narrow allocation on this band (only 7.035-7.045) results in AMTOR, Pactor and G-TOR ARQ overlapping each other. Packet radio working down as low as 7.032 in the CW section does nothing to improve matters."

"14 Mhz– RTTY is well disciplined between 14.080 and 14.090. AMTOR, Pactor and G-TOR confine themselves to 14.070-14.080 although one well know AMTOR mailbox was found working at 14.0965. Packet could be found anywhere between 14.085 and 14.106, again well below the recommended frequency. This often promotes aggravated RTTY stations to call CQ on top of them. Packet stations were also found using the exclusive beacon frequencies at 14.099-14.101."

Bob operates in RTTY, AMTOR and Pactor, can read the G-TOR FEC calls. But he does not have an HF Packet capability so he is unable to identify the offending stations. Packet is not the only offender, though. "There are so many Pactor mailboxes on 3.5 Mhz it is difficult for the keyboarder to settle on any frequency using RTTY or AMTOR without suffering interference from stations (the majority being German) attempting to open a Pactor mailbox even when the frequency is obviously in use."

Packet puzzles Bob, for while it is the only mode regularly working outside the agreed allocations, much of the Packet space is unused! Note that he found Packet activity only up to 14.106, well short of Region 1's upper limit for the mode. This identical phenomenon has been reported (and bemoaned) in North America any number of times. While the unattended Packet BBS operators are pushing all the way down below 14.085, the space above 14.105 is largely *Packet Void* instead of *Packet Preferred.* This violates the Region 2 agreement, of course, and presumably will violate the law in the USA by yearend. Nonetheless, the reason for this behavior remains buried in some undiscovered time capsule, or secret code somewhere or other.

Otherwise Bob opines that AMTOR, G-TOR and Pactor are bound to suffer overlapping signals when required to share the same allocations. And, in his mind, the only solution is to break up the digital allocations into three discrete subbands for 1)ARQ modes 2) RTTY and 3) Packet. Acknowledging the problems of enforcement, let alone getting agreement, he feels strongly that the majority of keyboarders would welcome such boundaries. He adds that "Band planning should form part of all license examinations and thereby emphasize the importance of compliance."

Take a long hop now to yet another island–New Zealand. A lovely land, it is about as remote as they come. Yet, the ZL's are in a unique position to observe what is going on in and around the crowded bands to the north. Basil ZL2UT spent a portion of June watching the activity and came up with some observations quite consistent with all the others. His opinions, however, explore new ground. But then nobody every accused a ZL of being a conformist! So from .... **Up From Down Under.**

"There exists a verbal backlash from older hams who appear jealous of those who use and understand the new modes."

Basil reports "a definite move down in frequency, on both 20 and 40 meters, into the traditional CW territory." He knows the digital turf very well and, except for Clover is QRV on all modes including G-TOR. After spending many years on RTTY he has worked his way through the list and it is true that "I get about on the bands." Among the specific observations: a) Packet is moving down from 14.100-14.115 down to 14.090. "Lots more stations in the 14.090-14.100 area," b) "RTTY appears to be okay in their portion and I heard little interference in the month in this band portion," c) "G-TOR appears to be clustering around 14070," and d) "the move down in frequency is the same in the 40 meter band, the band where one finds the South American Packet guys in good numbers on top of the CW band."

Opinions are an important part of this survey and Basil supplied some surprising insights into the problems we might lay at the feet of the newcomers on the bands. "Older hams are leading them astray," says Basil. "There exists a continuing verbal back-lash from older hams who appear jealous of those who use and understand the new modes. I find a reluctance from many, both new and old, to physically get the plugs in their hands and attach them to their computer or modem. To counter this I have several spare modems which I take to the new chums who are interested in getting into digital. I then make up the serial cables, do all of the wiring and testing and get them going in this way. It certainly pays off."

Sound familiar? Perhaps we have all seen a trace of this "who needs these new modes, anyway?" syndrome. Perhaps there may be a trace of it here, there and everywhere, not only in ZL! If we were to leap all the way . . . **to New Jersey.**

"Technology advances rapidly and new modes appear before we are comfortable with the old ones."

Here we might catch a glimpse of it, even though Ted W2FG gave it another name. Ted is neither multi-mode nor multi-media. He professes to be primarily interested in DX and that means, for the most part, 45 baud Baudot RTTY. And he is pretty doggone good at that phase of digital activity!

"Technology," says Ted, "advances rapidly . . . and new modes appear before we are comfortable with the old ones." What a marvelous insight! If there is one sentence that can describe our quandary he has delivered it to us in the shortest possible form. But then he immediately switched to the subject closest to his heart. "RTTY DX-ing, once relegated to the fringes of the DX world, is now mainstream. All major DX-peditions now include RTTY and the resulting pileups include the callsigns of many well-known SSB and CW DX-ers and contesters who are looking for new horizons to conquer." At the same time, unfortunately, "there is a similar increase in interest in the burst (ARQ) modes for error free ragchewing and higher speed message forwarding." The two groups obviously must "fight for the very limited spectrum."

Ted feels that the RTTY gang, both ragchewers and DX-ers, maintain the "Gentlemen's Agreement" and stay above 14.080. "The burst modes supposedly agreed to stay below that point. This is certainly not happening today. Manuals accompanying the new TNC's recommend burst modes up to 14.085 while 14.080 has become a very popular frequency for both AMTOR and Pactor BBS's. "This brought about a major crisis when 3Y0PI announced their RTTY frequency as 14.080! Fortunately, while still on the boat, messages were sent to them to select a slightly higher frequency." The problem compounds itself because "for the most part, the DX signal is weak and, if a rare one, operates split frequency. One can't blame the new operator who, following the instruction manual, calls CQ on 14.082, thus ruining the only time the DX-pedition devotes to RTTY."

Then Ted's experience shows as he delves into the deeper waters of the conflict. ***"The only thing preventing a major conflict among the digital operators is poor propagation.*** We need a resolution before the sunspot cycle turns up. By then there will be many more digital operators on both sides of the fence. In looking for solutions, there seem to be two choices--expand up or down in frequency. Down is not possible. We are already in conflict with the CQ QRP-ers that use 14.060 to 14.070. During CW contests, there are CW CQ's up to 14.090 and beyond. My solution is to expand RTTY operations into the so-called foreign phone band, or 14.100-14.150. Although we could arbitrarily do this, the matter should be fully discussed at an international conference."

Even though Ted is a dyed-in-the-wool RTTY practitioner he stops well short of designing a bullet-proof plan for RTTY's survival. Some don't agree with such a liberal posture. Ted's neighbor and Northern New Jersey DX Association colleague, Bill NA2M takes off in a different direction and presents some ideas... **.from New York.**

"Packet stations are constantly moving down in to what has been RTTY territory."

First off, Bill feels that 30 meters is a band worth serious development. It's propagation is often excellent when 20 meters is dead and "there is so little digital activity there." Bill urges a shift in that direction particularly for Clover. But he takes quite a different stance regarding 40/20/15 and 10 meters. "I strongly urge ADRS to pursue a band plan giving Clover the 060-065 space, AMTOR/Pactor/G-TOR 065-079 and RTTY 080-100." Bill sees this as a necessary move because there are simply too many digital stations trying to squeeze into a relatively small part of the band. "Packet stations are constantly moving down in to what has been the RTTY territory. I don't believe they are educable. AMTOR and Pactor stations don't seem to recognize Clover signal tones and call CQ, often on top of Clover. Contests are the only time RTTY stations are able to spread out beyond their traditional frequencies."

Bill, while attempting to discover the secrets of the new modes, worries about the lack of Clover keyboard activity. He has yet to find the active frequencies. "I have been calling CQ on 40/30 and 20 many times without a reply. I monitor a few stations transferring a lot of traffic on these bands but I have never monitored a 2-way Clover QSO on Clover." He doesn't like the software either!

Part one of this survey would not be complete without a word from one more source. One of the obvious questions

floating in and around all of these discussions concerns RTTY and whether it can survive as the exclusive DX mode. Some think it will but . . .**the facts suggest change**

"Whenever there is a conflict between Pactor and RTTY, Pactor inevitably wins the ballgame."

may be taking place. For example, Jules condensed the last fourteen DX Pactor reports from VK2SG's RTTY DX notes. Four of the reported DX stations were operating below 14.069, nine were in the 14.070-79 (with 14.073 the most popular spot) and one was above 14.080. DX prefixes included ZA, XE, S9, 7Q, 9K, 9N, 5R, A4, VR6 and SU, a list many would want to snag for the log! So, while it appears that the RTTY portion of the band is not being invaded to any serious extent, Pactor is beyond the infant stage as a DX mode. And, as Jules says, "whenever there is a conflict between Pactor and RTTY, Pactor inevitably wins the ballgame. My limited operations on Clover also indicate the same." Time will tell.

We conclude this portion of the epistle as we began. While no conclusions spring forth at this point, it is obvious we are dealing with three unarguable elements, one more than discussed in the beginning. I then pointed out 1) basic change created the problem and 2) only basic change in our habits can solve the problem. Add now, courtesy of Ted, 3) only poor propagation prevents a major conflict among digital operators. Which means, quite simply, we must not only change our habits, we must do so within a reasonable time.

I am reminded of the day a few years ago when I worked 60-plus countries in a few hours, on one band, on one weekend on SSB during the CQWW contest. Not so unusual, you say? I found it a bit hard to believe at the time because my antenna system was a massive 40 inch whip on the balcony railing of an apartment! If we had such propagation today, the digital bands would be an indescribable mess. Remember . . . those days will return! Sooner than you think!

Opinions abound in these valuable reports. RTTY is dying; RTTY must be protected for DX and contests; go down the band; go up the band; automatic Packet is the true culprit; automatic BBS' are the problem; no, people calling BBS' without listening are the problem; band plans are the answer; no, they are not the answer; who needs the speed anyway; keyboarders can't find space. And so on, and on. Our corrective options seem as unlimited as our opportunities, if we but find the way. But to get there, we must overcome the Law of Reluctance. This age-old law deals not with electronics but with those who should know electronics the best--the "old guys." The "old guys," according to Basil are those who may stand in the way of progress. The "old guys" are those who might have begun to change, according to Jay. And as they do, as they (and we) most certainly will and must, Reluctance, like the melting icebergs of spring, will fall apart and fade away. And the "old guys" will lead the digital parade to even greater heights.

Jump at last to the front cover. The chart is a product of Peter's (TY1PS) fertile imagination and is hot off the press. When discussing this issue with him, he immediately thought in terms of taking a snapshot of the bands. Without delay he went to work in Visual Basic, took a picture, and came up with a . . .**DIFFERENT VIEW.**

But it is only a first step, for there is much to do between now and the next issue. Many more snapshots in many more locations at many more hours of the day are needed. And they will come as the distribution disk is released soon. For now, let's take a look at **ADRS BandCheck** and what the "first drafts" indicate. This ingenious bit of software directs the transceiver to scan each 500 Hz segment of the entire band in a matter of 70 or so seconds, then measures the presence of any signal through the sound card in the computer, adjusts for the noise floor to the lowest amplitude measured after each scan, then averages cumulative frequency utilization at the end of each pass. Sampling can be run manually or controlled by a built in adjustable timer. In order to use ADRS BandCheck v1.0 you need a computer with Windows 3.1, a sound card, an RS-232 interface between your computer and transceiver. Next month–a full discussion of this new program and more data from different locations.

Peter contributed BandCheck to the ADRS. His tireless work (at a time when the demands of his own business were extremely high) and his generosity are deeply appreciated by all who have an interest in the world of digital radio. Thanks, Peter, and now about that other idea we talked about . . .!

One final note: where do the new modes go? Too soon for any decisions, but it was pointed out that G-TOR seems to be clustering around 14.070. Clover, to those of us who have extensive keyboard experience with Express know it is at 14.065.5 or 7.065.5 LSB. That is the most popular place to gather or call CQ. Monitor 14064 as well.

More next month, along with more opinions, and questions for discussion. Stay tuned.

de **Jim, N2HOS** sk ■

Looking Back

20 years ago in RDJ

- An earlier LOOKING BACK feature includes letters from W6AEE and W6NRM, two pioneers in Amatuer RTTY.
- RY generator described. Kits available.
- HAL DKB02010 dual mode keyboard offers Morse and RTTY at 5 speeds. QBF key included.
- UART articles by W6FFC begin.
- W8BBB doing extensive, "RTTY For Beginners" series.
- Sid May, first to activate Gambia on RTTY, now QRV from St. Kitts and Montserrat for two more first-evers. Sid is pictured in kilts with bagpipes.
- VK9XW active, first Christmas Islan (sked FB with K6WZ).
- Pile-ups in CARTG contest for XW8HJ, HZ1SH, 3A2GX and CR6CA.
- Most issues of RDJ contain 35-40 classified ads.

DX NEWS

Jules Freundlich, W2JGR

Be sure to submit your list of Most Wanted Digital Countries

As promised last fall, we are finally in a position to conduct a survey of the Most Wanted Digital DXCC Countries. With the help of Bob, K0RC, we have been able to place the entire DXCC list on one page, in a readable form. It is included as the second page of this month's DX NEWS. For those who may be in their quest for their first, or second 100 countries, we have included ALL the countries on the list, even the semi-rare and not-so rare ones. At the top of the survey form, simply check off that you are showing THOSE YOU NEED, or THOSE YOU DON'T NEED. Your current DXCC standing will determine which is easiest for you. Make a copy of the survey page, and mail the completed form to the address indicated on it. We hope to have the results in the November or December issue.

DX DOINGS

(Signals are 45.5 Baud RTTY unless noted.)

ALBANIA, ZA - RTTY activity from this once rare land has recently picked up, with ZA1AJ and ZA1MH providing most of the action. Look for them on 20 meters almost any time of the day that propagaton permits. QSL ZA1AJ to OK2PSZ, and ZA1MH to Mike Holman, Box 19, Tirana, Albania. (Mike is an American missionary, whose home call is K5KWG, but he requests that QSLs be sent to his ZA address.)

ALGERIA, 7X - 7X2DS operates 20 meters as early as 1400Z, and as late as 2130Z. QSL to Box 105, Bouiba City, 35300 Algeria.

CROATIA, 9A - Jacky, F2CW, of 3Y5X (Bouvet) fame, is occupied in relief work in the Balkans. He was operating as 9A/F2CW until he received the call, 9A5CW. Look for his RTTY signal on 20 meters around 1800Z. He may also operate Amtor and Pactor. QSL to KC7V.

ETHIOPIA, ET - ET3YU continues to reward the faithful on 20 meters around 1645Z. QSL to P.O. Box 60349, Addis Ababa, Ethiopia.

FRENCH POLYNESIA, FO - Look for FO8MA on 20 meters around 0500Z. QSL route is needed.

INDONESIA, YB - Julian, YB3AQF, can be worked as early in the UTC day as 1200Z. QSL to Julian Morral, J.L. Vklampissharapani/No E, Blok AA-2, Surabaya 60117, Indonesia.

KERGUELEN, FT8 - Pierre, FT5XJ, showed up on RTTY during July. He will be back after a three month vacation. QSL to F5NLL or F1NLL.

KUWAIT, 9K - There is lots of action from this Gulf state. Adnan, 9K2KA, works Pactor on 14070 khz after 0000Z. QSL to Adnan Z. Alkazemi, P.O. Box 30, Safat, Kuwait. Mohsin, 9K2EC, also likes Pactor on 14071 khz after 1830Z. QSL to Abdulmohsin Barrak Al-Ajeel, P.O.Box 533, Safat, Kuwait. 9K2WA may be found on 20 meters after 0430Z. QSL to P.O. Box 25020, Safat 13111, Kuwait. Finally, look for 9K2ZZ on 20 meters after 1730Z. QSL via W8CNL.

LATVIA, YL - This country is becoming quite active on 20 meters. Active callsigns include YL1ZE, YL2KF, YL2PJ, YL2QC, and YL2TC (who was reported as inverted!). QSL routes are needed.

MADAGASCAR, 5R - 5R8KH may be found on Pactor around 1700Z on 14073 khz. QSL to WB8LFO.

MALAWI, 7Q - 7Q7JL works Pactor on 14069 khz, or 21069 khz between 1500Z and 1600Z. QSL to G0IAS.

MALI, TZ - Larry, TZ6VV,and his wife, Trish, are missionaries. Larry should be back in Bamako, in full operation by now, after having been QRT due to an extended bout with several health problems. In addition to himself, his IC-735 has been repaired, and he is sporting a new TS-450S. If all has gone according to plan, his new tower should be in place with his X-14 beam. Welcome him back on RTTY, or Pactor, and don't be surprised to see him show up in the CQ/RDJ WW RTTY DX Contest this month. QSL to Larry Erwin, BP 2786, Bamako, Mali.

MAURITIUS, 3B - Jacky, 3B8CF, can be found on 20 meters either early in the UTC day, around 0330Z, or as late as 1545Z. QSL via CBA.

NEPAL, 9N - Satish, 9N1AA now may be found on Pactor around 1745Z on 14077 khz. For QSL route see the RDJ for April 1994, p. 19. Satish warns that postal thievery of $US accompanying QSL cards is common, and suggests sending only IRC's. In addition, contributions of educational materials, including books, magazines, software, callbooks, etc are welcome to assist in the promotion of amateur radio by the Nepal Amateur Radio League (NARL).

NIGERIA, 5N - 5N3ALE may be found on Pactor on 14080 khz after 1745Z. QSL via DJ2VZ.

OMAN, A4 - Max, A45ZX continues to give a new one to the deserving on 20 meters around 0300Z. QSL to Max B. Barawid Jr., P.O. Box 123, Muscat, Sultanate of Oman. On Pactor you may find A41KB on 14072 or 14073 khz after 1200Z. QSL via ON6BY.

PAKISTAN, AP - AP2TJ appears on 20 meters around 1200Z. QSL route is needed.

PHILLIPINES, DU - DU1BJD operates 20 meters after 1245Z. QSL to '92, or later, CBA.

SAINT PAUL I., CY9 - From 19-25 September, this island will again be activated for those who still need it. Operators will be Randy, N0TG/CY9, Bob, KW2P/CY9, Ron, AA4VK/CY9, and Murray, WA4DAN/CY9. QSL to N0TG.

SAO TOME & PRINCIPE, S9 - Glenn, S92ZM now works Pactor, and frequents 21069 khz. when propagation allows. QSL to Glenn Britt, C. Postal 522, Sao Tome DRSTP, Portugal.

SINGAPORE, 9V - 9V1ZS likes 20 meters after 1300Z until about 1530Z. He may also be found as late as 1700Z. QSL route is needed.

SLOVENIA - Until the end of September, special event station, OM9SNP, honoring Slovenia's war dead and the 50th anniversary of the Slovenia uprising during WW II, will be operating all modes, 160-10m. QSL via OM3LA.

TANZANIA, 5H - 5H3MA worked on Pactor around 1420Z on 14073 is identified in the W6GO/K6HHD QSL Manager List, dated 17-Feb-94, as a pirate named Slim. Any other information on this station?

THAILAND, HS - HS0ZAA is active on 20 meters starting at about 1445Z. North American stations QSL to KM1R, others via NY2E.

TONGA, A3 - Craig, A35CT, appears quite regularly on 20 meters, starting at about 0300Z for an hour or more. QSL to Box 2290, Nuku Alofa, Kingdom of Tonga.

TURKISH REPUBLIC OF NORTHERN CYPRUS, 1B - Igor, KU0J has submitted considerable supporting documentation to the DX Advisory Committee (DXAC) to justify adding this country to the DXCC list. For some of the cogent details, see the RDJ of April 1994, page 19. The Committee was to have voted on his petition during August. The results may be known by the time you read this. If you hear any stations using the 1B prefix, WFWL. (I hope that political overtones do not kill this one.)

TURKEY, TA - TA1KA and TA2II are active on 20 meters. Check propagation to the area for best timing. QSL routes are needed.

HAVE DX NEWS?

Leave a message in the W2TKU/4(1) mailbox (AMTOR or CLOVER), find me on RTTY or via any of the following:

Packet W2JGR @ WB0GDB.#STP.MN.USA.NA
Telephone: (612) 377 7269
FAX: (612) 374 8161
or use the U.S. Postal Service.

THANKS - Thanks to the following for all your information: DJ3IW, I5FLN, K7WUW, K0RC, KU0J, N2DBI, OM3LA, W2TKU, W5KSI, W6GO, WA4RGH, WB2CJL, TZ6VV, ZS5S. and 9N1AA.

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

PAX....73 de **Jules W2JGR** ■

1. W2TKU/4 scans 7070, 7076, 14072, 14076, 14078, 21074, and 21080 khz. on AMTOR. On CLOVER, he scans 7066, 7068, 10136, 14066, 14067, 14068, 21064,and 21066 khz.

1994 *RTTY DIGITAL JOURNAL* NEEDED DXCC COUNTRIES SURVEY

Your callsign _____ and date submitted _____.
This survey will be used to compile a list of *"Most Wanted Digital Countries"*. The results will be published in W2JGR's DX NEWS column in a future issue of the *RTTY Digital Journal*. Decide whether the prefixes you check-off will indicate countries you have □ *already* worked, or are countries you □ *need* to work. One method will be easier for you, depending upon your current digital DXCC standing. Mail your completed form before October 31, 1994 to the following address: Robert Chudek – KØRC, 3110 Evelyn Street, Saint Paul, MN 55113-1213, USA.

□	1AØ	Sov Mil Order of Malta	□	CU	Azores	□	KC4	Antarctica	□	TY	Benin
□	1S	Spratly Island	□	CV-CX	Uruguay	□	KC6	Belau / Palau (West Caroline Islands)	□	TZ	Mali
□	3A	Monaco	□	CY9	St Paul Island				□	UA1,3,4,6	European Russia
□	3B6,7	Agalega & St Brandon	□	CYØ	Sable Island	□	KG4	Guantanamo Bay	□	UA2	Kaliningrad
□	3B8	Mauritius	□	D2-D3	Angola	□	KH1	Baker and Howland	□	UA8,9,Ø	Asiatic Russia
□	3B9	Rodriguez Island	□	D4	Cape Verde	□	KH2	Guam	□	UJ-UM	Uzbekistan
□	3C	Equatorial Guinea	□	D6,FH8	Comoros	□	KH3	Johnston Island	□	UN-UQ	Kazakhstan
□	3CØ	Pagalu Island	□	DA-DL	Fed Rep of Germany	□	KH4	Midway Island	□	UR-UZ	Ukraine
□	3D2	Fiji Islands	□	DU-DZ	Philippines	□	KH5/k	Kingman Reef	□	V2	Antigua and Barbuda
□	3D2/c	Conway Reef	□	E3	Eritrea	□	KH5/p	Palmyra & Jarvis Island	□	V3	Belize
□	3D2/r	Rotuma Island	□	EA-EH	Spain	□	KH6	Hawaii	□	V4	St Kitts & Nevis Islands
□	3DA	Swaziland	□	EA6	Balearic Islands	□	KH7	Kure Island	□	V5	Namibia
□	3V	Tunisia	□	EA8	Canary Islands	□	KH8	American Samoa	□	V6	Micronesia
□	3W,XV	Vietnam	□	EA9	Ceuta and Melilla	□	KH9	Wake Island	□	V7	Marshall Islands
□	3X	Guinea	□	EI-EJ	Ireland	□	KHØ	Mariana Islands	□	V8	Brunei
□	3Y	Bouvet Island	□	EK,UG	Armenia	□	KL7	Alaska	□	VE,VO	Canada
□	3Y/p	Peter 1 Island	□	EL	Liberia	□	KP1	Navassa Island	□	VK	Australia
□	4J-4K	Azerbaijan	□	EP-EQ	Iran	□	KP2	Virgin Islands	□	VK9/c	Cocos Keeling Island
□	4J1	Malyj Vysotskij Island	□	ER,UO	Moldova	□	KP4	Puerto Rico	□	VK9/l	Lord Howe Island
□	4K2,UA1	Franz Joseph Land	□	ES	Estonia	□	KP5	Desecheo Island	□	VK9/m	Mellish Reef
□	4L,UF	Georgia	□	ET	Ethiopia	□	LA-LN	Norway	□	VK9/n	Norfolk Island
□	4P-4S	Sri Lanka	□	EU-EW	Belarus	□	LU	Argentina	□	VK9/w	Willis Island
□	4U1/i	ITU HQ, Geneva	□	EX,UM	Kyrgystan	□	LX	Luxembourg	□	VK9/x	Christmas Island
□	4U1/u	United Nations HQ, NYC	□	EY,UJ	Tajikistan	□	LY,UP	Lithuania	□	VKØ/h	Heard Island
□	4X,4Z	Israel	□	EZ,UH	Turkmenistan	□	LZ	Bulgaria	□	VKØ/m	Macquarie Island
□	5A	Libya	□	F	France	□	OA-OC	Peru	□	VP2/e	Anguilla
□	5B	Cyprus	□	FG	Guadeloupe	□	OD	Lebanon	□	VP2/m	Montserrat
□	5H-5I	Tanzania	□	FH	Mayotte	□	OE	Austria	□	VP2/v	British Virgin Islands
□	5N-5O	Nigeria	□	FJ,FS	Saint Martin	□	OF-OI	Finland	□	VP5	Turks and Caicos Islands
□	5R-5S	Madagascar	□	FK	New Caledonia	□	OHØ	Aland Island	□	VP8	Falkland Islands
□	5T	Mauritania	□	FM	Martinique	□	OJØ	Market Reef	□	VP8/g	South Georgia Islands
□	5U	Niger	□	FO	French Polynesia	□	OK-OL	Czech Republic	□	VP8/h	South Shetland Islands
□	5V	Togo	□	FO/c	Clipperton Island	□	OM,4N3	Slovak Republic	□	VP8/o	South Orkney Islands
□	5W	Western Samoa	□	FP	St Pierre & Miquelon	□	ON-OT	Belgium	□	VP8/s	South Sandwich Islands
□	5X	Uganda	□	FR	Reunion Island	□	OX	Greenland	□	VP9	Bermuda
□	5Y-5Z	Kenya	□	FR/g	Glorioso Island	□	OY	Faroe Islands	□	VQ9	Chagos Island
□	6V-6W	Senegal	□	FR/j/e	Juan de Nova & Europa	□	OZ	Denmark	□	VR6	Pitcairn Island
□	6Y	Jamaica	□	FR/t	Tromelin Island	□	P2	Papua New Guinea	□	VS6	Hong Kong
□	7O	Yemen	□	FT8/w	Crozet Island	□	P4	Aruba	□	VU	India
□	7P	Lesotho	□	FT8/x	Kerguelen Islands	□	PA-PI	Netherlands	□	VU/a	Andaman & Nicobar
□	7Q	Malawi	□	FT8/z	Amsterdam & St Paul	□	PJ2,4,9,Ø	Netherlands Antilles, Bonair, & Curacao	□	VU/l	Laccadive Islands
□	7T-7Y	Algeria	□	FW	Wallis & Futuna Islands				□	XA-XI	Mexico
□	8P	Barbados	□	FY	French Guiana	□	PJ5,6,7,8	St Maarten, Saba, & St Eustatius Islands	□	XF4	Revilla Gigedo
□	8Q	Maldive Islands	□	G	England				□	XT	Burkina Faso
□	8R	Guyana	□	GD,GT	Isle of Man	□	PP-PY	Brazil	□	XU	Kampuchea (Cambodia)
□	9A,YU2	Croatia	□	GI,GN	Northern Ireland	□	PYØ/f	Fernando de Noronha	□	XW	Laos
□	9G	Ghana	□	GJ,GH	Jersey	□	PYØ/s	St Peter and St Paul Rocks	□	XX9	Macao
□	9H	Malta	□	GM,GS	Scotland	□	PYØ/t	Trindade & Martim Vaz	□	XY-XZ	Myanmar (Burma)
□	9I-9J	Zambia	□	GU,GP	Guernsey	□	PZ	Suriname	□	YA	Afghanistan
□	9K	Kuwait	□	GW,GC	Wales	□	S2	Bangladesh	□	YB-YH	Indonesia
□	9L	Sierra Leone	□	H4	Solomon Islands	□	S5,YU3	Slovenia	□	YI	Iraq
□	9M2,4	West Malaysia	□	HA,HG	Hungary	□	S7	Seychelles	□	YJ	Vanuatu (New Hebrides)
□	9M6,8	East Malaysia	□	HB	Switzerland	□	S9	Sao Tome & Principe	□	YK	Syria
□	9N	Nepal	□	HBØ	Liechtenstein	□	SØ	Western Sahara	□	YL,UQ	Latvia
□	9Q-9T	Zaire	□	HC-HD	Ecuador	□	SA-SM	Sweden	□	YN	Nicaragua
□	9U	Burundi	□	HC8	Galapagos Island	□	SN-SR	Poland	□	YO-YR	Romania
□	9V	Singapore	□	HH	Haiti	□	ST	Sudan	□	YS	El Salvador
□	9X	Rwanda	□	HI	Dominican Republic	□	STØ	Southern Sudan	□	YT-YU	Yugoslavia
□	9Y-9Z	Trinidad & Tobago	□	HJ-HK	Colombia	□	SU	Egypt	□	YV-YY	Venezuela
□	A2	Botswana	□	HKØ/a	San Andres & Providencia	□	SV-SZ	Greece	□	YVØ	Aves Island
□	A3	Tonga	□	HKØ/m	Malpelo Island	□	SV/A	Mount Athos	□	Z2	Zimbabwe
□	A4	Oman	□	HL	South Korea	□	SV5	Dodecanese (Rhodes)	□	Z3,4N5	Macedonia
□	A5	Bhutan	□	HO-HP	Panama	□	SV9	Crete	□	ZA	Albania
□	A6	United Arab Emirates	□	HQ-HR	Honduras	□	T2	Tuvalu	□	ZB2	Gibraltar
□	A7	Qatar	□	HS	Thailand	□	T31	Kiribati, Central	□	ZC4	British Sovereign Bases on Cyprus
□	A9	Bahrain	□	HV	Vatican City	□	T32	Kiribati, Eastern			
□	AP-AS	Pakistan	□	HZ	Saudi Arabia	□	T33	Banaba (Ocean) Island	□	ZD7	St Helena
□	BV	Taiwan	□	I	Italy	□	T3Ø	Kiribati, Western	□	ZD8	Ascension Island
□	BY,BT	China	□	ISØ	Sardinia	□	T5	Somalia	□	ZD9	Tristan de Cunha & Gough Islands
□	C2	Nauru	□	J2	Djibouti	□	T7	San Marino			
□	C3	Andorra	□	J3	Grenada	□	T9,4N4	Bosnia-Herzegovina	□	ZF	Cayman Islands
□	C5	The Gambia	□	J5	Guinea-Bissau	□	TA-TC	Turkey	□	ZK1/n	Cook Islands, North
□	C6	Bahamas	□	J6	St Lucia	□	TF	Iceland	□	ZK1/s	Cook Islands, South
□	C8-C9	Mozambique	□	J7	Dominica	□	TG,TD	Guatemala	□	ZK2	Niue
□	CA-CE	Chile	□	J8	St Vincent	□	TI,TE	Costa Rica	□	ZK3	Tokelau Islands
□	CEØA	Easter Island	□	JA-JS	Japan	□	TI9	Cocos Island	□	ZL-ZM	New Zealand
□	CEØX	San Felix & San Ambrosio	□	JD1/m	Minami Torishima	□	TJ	Cameroon	□	ZL7	Chatham Island
□	CEØZ	Juan Fernandez Island	□	JD1/o	Ogasawara	□	TK	Corsica	□	ZL8	Kermadec Island
□	CM,CO	Cuba	□	JT-JV	Mongolia	□	TL	Central Africa	□	ZL9	Auckland and Campbell
□	CN	Morocco	□	JW	Svalbard	□	TN	Congo	□	ZP	Paraguay
□	CP	Bolivia	□	JX	Jan Mayen	□	TR	Gabon	□	ZR-ZU	South Africa
□	CT	Portugal	□	JY	Jordan	□	TT	Chad	□	ZS8	Prince Edward & Marion
□	CT3	Madeira Island	□	K,N,W,A	United States	□	TU	Ivory Coast			

CONTESTING

Richard Lawton, N6GG
The Shadow is the secret!

RTTY Contests - Coming Events

Date:	Contest:
SEP 4	**DARC CORONA 10M Digi (German) --NEW!**
SEP 24-25	CQ WW Digital (USA)
OCT 15-16	JARTS WW RTTY (Japan)
NOV 6	DARC CORONA 10M Digi (German) --NEW!

-- -- REMINDERS: -- --

BARTG AMTOR/PACTOR Contest (July) log entries must be received by SEP 10, 1994.

Mail logs to:
JOHN BARBER, G4SKA
PO BOX 8
TIVERTON, DEVON
EX16 5YU, ENGLAND

-- -- COMING UP: -- --

DARC CORONA 10M Digital Contest

September 4, 1994

Sponsored by Deutscher Amateur-Radio-Club e.V. (DARC)

CONTEST PERIOD: Sunday, September 4, from 1100Z to 1700Z (6 hours)

NOTE: Contest will take place on the first Sunday of March, July, September, and November of each year.

MODES: RTTY, AMTOR, PACTOR, and CLOVER

BANDS: 10M ONLY

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

CONTEST CALL:

for RTTY: **"CQ CORONA TEST DE ....."**

for AMTOR/PACTOR: **use FEC (mode B) for "CQ CORONA TEST de sellcall XXXX"**

Use ARQ (mode A) for answering and contest exchange. Contest exchange in any other mode is subject to disqualification.

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

All others: send RST + QSO nr. + name

CONTACTS: Additional QSOs are allowed with same station on different mode after a 15 minute interval, or after a QSO with another station.

MULTIPLIERS: Each DXCC/WAE country, and each USA state, and each call district in JA,VE,and VK, (NOT USA). Count only the first QSO with a USA station as a DXCC/WAE country multiplier.

QSO POINTS: Count 1 point for each completed QSO.

FINAL SCORE: Total QSOs x total multipliers.

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

LOGS: Use separate logsheets for each mode. Logsheets must contain: Date, Mode, Time UTC, Callsign, message sent/received, name, USA-State, first-time multiplier prefix, 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: All logs must be received by 60 days after the Contest.

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

COMMENTS: This is an all-digital 10M contest, except for HF Packet, and it is 6 hours long. It occurs on Sundays, 4 times a year. There are no multipliers for USA call areas. Just the STATES count for mults. This means that only your FIRST USA QSO in the contest will count for a DXCC/WAE country mult, along with the State mult. No indication was made about counting multipliers again after changing digital modes.

CQ/RTTY Journal WW RTTY Contest

September 24-25, 1994

Sponsored by CQ Magazine and ADRS RTTY/Digital Journal

NOTE: Major change in this year's rules; NO rest periods required.

CONTEST PERIOD: STARTS at 0000 UTC Saturday, and ENDS at 2400 UTC Sunday, a total of 48 hours. NO REST PERIODS REQUIRED for any entries.

BANDS: 80, 40, 20, 15, and 10M. (five bands)

OPERATOR CLASSES: There is **a High Power** category (more than 150 watts) and **a Low Power** catagory (less than 150 watts). ONLY Single Op, All Band entries, and Multi-op single transmitter entries are eligible to enter the High or Low Power catagories. Enter one or the other, and so note in your log. Single band Assisted and Multi-multi entries are not eligible to enter these catagories.

A) **Single Op, All Band and Single Band.** One person performs all operating and logging functions. Use of Spotting Nets, DX Alert Packet Systems, telephone, etc., is NOT permitted.

B) **Single Op, Assisted, All Band Only.** One person performs all operating and logging functions. However, the use of DX Spotting nets or any other form of DX alerting assistance IS allowed. The operator can change bands at any time. Single op stations are allowed only one transmitted signal at any given time.

C) **Multi-Op, Single Transmitter.** All band entry only. More than one person operates, logs, checks for dupes, use of spotting, etc.

NOTE: Only one (1) transmitter and one (1) band permitted during the same period (defined as ten [10] minutes). Once the station has begun operation on a given band, it MUST remain on that band for 10 minutes; listening time counts as operating time. EXCEPTION: One, and only one, other band may be used during the same time period if, and only if, the station worked is a new multiplier. Logs found in violation of the ten minute rule will be automatically reclassified as multi-multi to reflect their actual status.

D) **Multi-Op, Multi-Transmitter.** All band entry only. No limit to number of transmitters, but only one (1) signal per band permitted. All transmitters must be located within a 500 meter diameter, or within the property limits of the station licensee's address, whichever is greater. The antennas must be physically connected by wires to the transmitter.

ENTRY CATEGORIES: Single op entries may enter as: a) All Band High Power or Low Power; b) Single Band; or c) Single op Assisted, All Band. Multi-ops may enter as a) Multi-op, Single Transmitter, High Power or Low Power, All Band; or b) Multi-op, Multi Transmittr, All Band.

MODES: Contacts may be made using Baudot (RTTY), ASCII, Amtor (FEC and ARQ), and Packet. (No unattended operation or contacts through gateways or digipeaters.)

VALID CONTACTS: A given station may be contacted only once per band, regardless of the digital mode employed. Additional contacts are allowed with the same station on each of the other bands.

EXCHANGE: Stations within the 48 Continental United States and the 13 Canadian areas must transmit RST + State or VE area + CQ Zone number. All other stations must transmit RST + CQ Zone number.

COUNTRIES: The ARRL and WAE DX Country lists will be used. **NOTE: USA states and Canada areas also count as country multipliers.** Example: The first US State and Canadian area you work not only counts as a multiplier for the state or area, but will also count as a country multiplier for each band.

QSO Points: One (1) QSO point for contacts within your own country. Two (2) QSO points for contacts outside your own country but within your own continent. Three (3) QSO points for contacts outside your own continent.

MULTIPLIER POINTS: One (1) multiplier point for each US state (48) and each Canadian area (13) on each band. One (1) multiplier point for each DX country in the ARRL and/or WAE lists on each band. NOTE: **KH6 and KL7 are country multipliers only - not state multipliers.** One (1) multiplier point for each CQ Zone worked on each band - a maximum of 40 per band.

The 13 Canadian areas are:

VO1	VE2	VE7
VO2	VE3	VE8 N.W.T.
VE1	N.B.	VE4 VY Yukon
VE1	N.S.	VE5
VE1	P.E.I.	VE6

FINAL SCORE: Total of QSO points times the total multipliers.

CONTEST ENTRIES AND LOGGING INSTRUCTIONS: CQ WW RTTY DX logs and forms should be used to facilitate scoring and checking. **All logs must show:**

1. Times in UTC.

2. All sent and received exchanges are to be logged (callsign, RST, Zone, Country, State/VE area, points claimed).

3. Indicate State/VE area, and country multiplier *only the first time it is worked on each band.*

4. Use a separate log sheet for *each band.*

5. Have a list of stations QSOed on *each band.* (a *dupesheet*).

6. Have a *multiplier check sheet* for *each band.*

7. An overall *SUMMARY SHEET* showing total QSOs, points, Zones, Countries, and State/VE areas worked.

8. Each entry must be accompanied by a signed declaration that all contest rules and regulations for amateur radio in the country of operation have been observed.

DISQUALIFICATIONS: Operating in an unsportsmanlike manner, manipulating scores or times to achieve a score advantage, or failure to omit duplicate contacts which would reduce the overall score more than 2% are grounds for disqualification. The use of non-amateur means such as telephones, telegrams, etc., to elicit contacts or multipliers during the contest is unsportsmanlike and the entry is subject to disqualification. Actions and decisions of the Contest committee are official and final.

AWARDS: Plaques will be awarded to the first-place finishers in each of the operator classes. Certificates will be awarded to second and third. Certificates will be awarded to the first-place finishers in each DX country.

To be eligible for awards, a Single Operator must operate a minimum of 12 hours, and a Multi-Op entry must operate a minimum of 18 hours.

DEADLINE: All entries must be postmarked no later than December 1, 1994 An extension may be given if requested.

Mail logs to:

ROY GOULD, KT1N
CQ WW RTTY DX CONTEST DIRECTOR
BOX DX
STOW, MA 01775
USA

COMMENTS: This is the most popular world-wide RTTY DX contest. It's also the most challenging. With the whole world participating, the CQ Zone multipliers, band multipliers, States and VE areas counting as different countries, there's a lot to keep track of. The low power/high power classes bring more participants. With all those multipliers around, the question becomes, shall I "Hunt and Pounce", or shall I call CQ? Well, you'll have to do both to make a good score. The rarer place you're in, the more a CQ will get you more QSOs. But in order to get those rarer mults, you've got to go hunting. With 48 states, 13 VE areas and 2 countries to go after on EACH band, look for lots of activity on 80 and 40M for all those easy multipliers, inbetween the static crashes! During September, 20M is still the old standby. 15M should be getting better, but 10M will probably be quite unreliable.

JARTS WW RTTY Contest

October 15-16, 1994

Sponsored by JARTS (President: JA1ACB)

Supported by Japanese CQ Magazine

CONTEST PERIOD: STARTS at 0000 UTC Saturday, October 15th, and ENDS at 2400 UTC Sunday, October 16th, a total of 48 hours. You can operate all 48 hours. (No OFF periods required.)

BANDS: 80, 40, 20, 15, and 10M (five bands). Japanese RTTY segments are:

BAND JA RTTY SEGMENT

80M 3.520 --- 3.525 MHz note!

40M 7.025 -- 7.040 MHz note!

20M14.070 -- 14.112 MHz

15M21.070 -- 21.125 MHz

10M28.070 -- 28.150 MHz

MODE: Baudot (RTTY) only.

OPERATOR CLASSES:

A) Single Operator, All Band

B) Multi-Operator, Single Transmitter

C) SWL

MESSAGE EXCHANGE: RST + Operator's age. (00 acceptable for YL and XYL) All Multi-op stations must send 99 as operator age.

QSO POINTS: Two (2) points for QSO within your own continent.

Three (3) points for QSO outside your own continent.

MULTIPLIER: Each DXCC country and JA/VK/W/VE call area count as a multiplier. But you cannot count JA/VK/W/VE *country* as a multiplier. **Multiplier will count once per band.** You can count your own country or call area (JA/VK/W/VE) as a multiplier.

FINAL SCORE: Total of QSO points times total of multipliers. (For SWL's, same rules as above.

AWARDS: First place plaques to top winner in all three classes. First through fifth place will receive certificates, all three classes in each continent, if number of QSO's is reasonable. Special award for 13th from last in all three classes.

LOGS and SUMMARY: The logs to contain: BAND, DATE/TIME UTC, CALLSIGN, RST/AGE sent and received, MULTIPLIERS, and POINTS claimed. Any entry making more than 200 QSOs must submit duplicate checksheet. Use separate logsheets for each band, and include a Summary Sheet showing the scoring, class, your call, name and address. Multi-Op stations please include names and call-signs of all operators. Logsheets and Summary sheets are available from Contest Manager, JH1BIH.

DEADLINE: Logs must be received by December 31, 1994.

Mail to:

JARTS Contest Manager
Hiroshi Aihara, JH1BIH
1-29 Honcho,
4 Shiki Saitama 353,
JAPAN

COMMENTS: This is the 3rd Annual JARTS WW RTTY Contest, and is really a lot of fun. From the clever "age exchange" we find just how young we all are, and who the bashful YL ops are, too! Band multipliers will open up ALL the bands. Note the JA RTTY segments on 40 and 80M. October propagation conditions are usually getting good again, with less low band static and better high band paths, world-wide. There are no time-off periods that must be taken, so you're free to pace yourself based on band conditions, and not on running out of time. If you don't intend to make a huge score, consider going for the award for 13th from last place in your class. It will require very precise timing and judgement on your part - and you have to send in your logs to JARTS Contest Manager, JH1BIH. Only he can decide. This is probably the most difficult award one can ever achieve in Contesting! Good Luck!

DARC CORONA 10M Digital Contest

November 6, 1994

Sponsored by Deutscher Amateur-Radio-Club e.V. (DARC)

Same rules as September 4 contest. See above.

Which Way is North? The Shadow Knows...

Most of us in the Contesting/DXing arena use rotary beam antennas. The beam direction indicating mechanism is often suspect, especially when that rare DX in the pileup constantly ignores our timely calls and comes back to someone else. The urge arises to go outside immediately and see if the beam is pointed where the indicator says it is. (At night? In the rain? Even snow? YES!)

The indicator *must* be reliable and accurate, and be set precisely on True North. There's a need to check the indicator periodically because of two troublesome slippage spots: the mechanical joining of the mast with the rotator, and boom-to-mast clamps. After many years of trying various schemes, I've come up with a rather simple way to set and check the beam heading, using the sun's shadow to nail down the key directions at any QTH.

Twice a year the sun crosses the equator. It's called the **Celestial Equinox**, also known as the first day of Spring and the last day of Summer. It happens around March 17-23 and September 19-25. During these two six-day periods the span of days and nights are equal; that is, the days and nights are each 12 hours long, all over the world. And the sun is due south at actual noontime in the northern hemisphere.

To use the sun's shadow for setting your beam indicator, you have to know when actual noon occurs at your QTH. If you know the exact time of your sunrise and/or sunset, you can easily calculate the time of actual noon where you live. (The rise/set data for your area can be found in the Old Farmer's Almanac.) Actual noon is 6 hours after sunrise and 6 hours before sunset. **At that moment everything that is 90 degrees vertical will cast a shadow precisely north. NOTE: this is NOT 12 noon by the clock.**

From the above info, shadows made by the sun around this time move at the rate of 15 degrees per hour, or about 1 degree every 4 minutes. That gives plenty of time to set up your permanent north-south baseline as follows:

To create a north-south line in your yard, drive a stake in the ground along where the shadow of your tower lays at that mid-day moment. Next, go inside and turn your beam to point north, as indicated by the indicator. Now go outside and look at the *beam's boom shadow.* It should be lined up with the tower shadow. If your yard is not large enough to be able to see the boom shadow, try going to the south side of the tower and sight along the north-south line to see if the boom lines up with the shadow. *Now that you have a north-south baseline right from the tower base, you can check your beam indicator any day of the year using the boom's shadow lining up with the tower's shadow, whenever it lies on that north-south line.*

If your beam is a Yagi, and one of the elements is close to the rotating mast, check for east and west by sighting along that element. (Ahem. I assume that your elements are at right angles to the boom...) If you have a QTH where you can actually see the sun rise or set (lucky you!), those directions are also precisely east and west during this period. Again, drive a stake, or graffiti a house wall, or fence (except if you live in Singapore) at these spots where the shadow lies.

The Shadow knows... and it doesn't lie!... Well... it does, but it doesn't.

((73))

See you in the pileups,

de Rich, N6GG ■

P.S.

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

RESULTS OF 1993 JARTS WW RTTY CONTEST

16-17 October 1993

from JARTS Contest Manager JH1BIH

SINGLE OPERATOR ALL BAND

Nr.	CALLSIGN	QSO's	PTS	MLTS	SCORE	PLACE
1	UH8EA	876	1486	191	471,006	AS 1st
2	OH2GI	530	1380	176	242,880	EU 1st
3	AB5KD	681	1609	145	233,305	NA 1st
4	KP2N	626	1466	126	184,716	NA 2nd
5	N2DL	435	1169	146	170,674	NA 3rd
6	UA4LCQ	425	1108	154	170,632	EU 2nd
7	OH2LU	417	1078	143	154,154	EU 3rd
8	WA7FAB	500	1144	120	137,280	NA 4th
9	N6GG	444	1063	124	131,812	NA 5th
10	SP4CHY	350	893	130	116,090	EU 4th
11	JA3DLE/1	376	1047	108	113,076	AS 2nd
12	W6/G0AZT	372	866	123	106,518	
13	JH1HRJ	300	843	95	80,085	AS 3rd
14	JR5JAQ	305	859	90	77,310	AS 4th
15	I2WEG	230	566	130	73,580	EU 5th
16	JH7QXJ	238	665	90	59,850	AS 5th
17	VK9XG	333	994	60	59,640	OC 1st
18	AA5AU	278	656	90	59,040	
19	HA5CP	219	594	94	55,836	
20	IV3FSG	238	648	83	53,784	
21	HB0/HB9NL	306	839	60	50,340	
22	GM0/WN1G	213	552	89	49,128	
23	LA7AJ	198	511	90	45,990	
24	CT1AUR	204	523	84	43,932	
25	OK1AJN	179	474	88	41,712	
26	UN5PR	161	445	89	39,605	
27	A45ZX	224	402	95	38,190	
28	KK6PD	243	539	68	36,652	
29	W4IF	159	428	82	35,096	
30	JA3EOP	151	423	82	34,686	
31	N8ABW	113	428	74	31,672	
32	AH6JF	180	534	58	30,972	OC 2nd
33	IK1HSR	153	406	75	30,450	
34	NA2M	226	537	56	30,072	
35	RA9LR	150	372	79	29,388	
36	W4GIV	141	357	79	28,203	
37	IK6CGO	133	358	71	25,418	
38	K2PS	135	355	68	24,140	
39	JA1BLV	135	338	67	22,646	
40	WA6VZI	143	330	68	22,440	
41	G4SKA	145	357	61	21,777	
42	W3FV	128	348	62	21,452	
43	SP7IIT	122	322	65	20,930	
44	LA3RIA	92	543	38	20,634	
45	DK7TR	134	324	57	18,468	
46	N7GVV	130	302	60	18,120	
47	LU8FDZ	128	377	48	18,096	SA 1st
48	NH6XM	121	357	50	17,850	OC 3rd
49	W2JGR/0	173	394	42	16,548	
50	K6UO	97	250	62	15,500	
51	Z32JA	158	411	37	15,207	
52	SP4KM	105	286	53	15,158	
53	W6MTJ	107	256	54	13,824	
54	K9VQK	81	201	62	12,462	
55	JA1PCM	76	207	60	12,420	
56	SP2FOV	91	252	48	12,096	
57	ZL2JON	72	187	62	11,594	OC 4th
58	VK6GOM	103	296	38	11,248	OC 5th
59	SP3BGD	71	196	49	9,604	
60	KI4MI	69	167	57	9,519	
61	UB5LBX	104	271	35	9,485	
62	KE9CU	82	195	48	9,360	
63	JA1WYQ	69	191	48	9,168	
64	JA1EUL	71	199	46	9,154	
65	SP6AOI	85	204	43	8,772	
66	SP1AAQ	72	173	46	7,958	
67	SP6NVK	72	172	43	7,396	
68	NL7DU	82	187	36	6,732	
69	WA8FLF	64	164	41	6,724	
70	K0OST	63	165	32	5,280	
71	SM7BHM	50	123	42	5,166	
72	JA1OQJ	48	126	41	5,166	
73	N2FF	52	134	38	5,092	
74	JN3TMW	45	121	39	4,719	
75	JL1AVD	45	101	45	4,545	
76	W6JOX	56	116	37	4,292	
77	JF1CST	51	132	29	3,828	
78	JA3BSH	47	125	30	3,750	
79	CP1FF	47	136	24	3,264	SA 2nd
80	LA9FFA	41	106	27	2,862	
81	OH3KPJ	40	104	27	2,808	
82	SP3EJJ	35	96	27	2,592	
83	SP4SKA	36	81	23	1,863	
84	DF5BX	24	63	22	1,386	
85	JE2LPC	21	59	20	1,180	
86	JH1TYU	22	61	17	1,037	
87	VE7VDQ	23	55	17	935	
88	JA4RTX	19	51	18	918	
89	KI5IB	26	56	16	896	
90	VE2AXO	23	50	16	800	Special 13th
91	VE4GN	22	47	15	705	
92	JA3JWB	14	51	11	561	
93	WA4MXZ	14	40	14	560	
94	YB3OSE	23	69	8	552	
95	LA1ZIA	18	46	12	552	
96	SP5MBI	17	39	13	507	
97	JF2WEQ	11	30	11	330	
98	JA5MOO/4	9	23	8	184	
99	VE6ZX	3	7	3	21	
100	W8ISG	4	8	2	16	
101	DJ2YE	3	6	2	12	

MULTI OPERATOR, ALL BAND

1	UZ9CWA	649	1764	184	324,576
2	VE7SAY	479	1092	117	127,764
3	KB8LUJ	332	818	126	103,068
4	DL0HFC	19	50	17	850

SWL (LISTEN's)

1	OLN383	419	1074	157	168,618
2	BRS27239	152	349	81	28,269
3	DE0GMH	34	117	34	3,978

Check Logs: OH3MFP, SM4RGD, JE1ARQ, 4X6UO, I2HWI, and VE3FJB

39th European DX Contest (WAEDC) RTTY 1993

Space linitations prevent the DJ from publishing all the results from this contest. However, we would like to give credit to the few USA stations who participated. In Single Operator Class; K5KLA, WA2WYR, NA2M, KC4IYD, W9FFC/2 and WA8FLF. Multi-Op Single TX; W9NGA. The complete results will be published in the DARC's CQDL magazine and in the WAEDC contest booklet. If you would like a copy of the contest booklet, write to WAEDC Contest Committee, POB 1126, D-74370 Serheim, Germany

Technologically Advanced Digital Communications

The KPC-3 is a fully-equipped packet TNC with many innovative features and uses. Despite its outstanding capabilities, it is extremely compact and requires very little power. The KPC-3 and other Kantronics-made TNC's (KPC-9612, KAM Plus, and others) represent contemporary design standards - evident by all the capabilities packaged into small units requiring very low power. To design superior TNC's, Kantronics utilizes modern technology and design, as well as sophisticated firmware (software on an EPROM) rather than additional hardware. In this way, Kantronics produces technologically superior products such as the KPC-3 that perform well, are extremely reliable, and are very affordable.

With the KPC-3 still in the conception stage, Kantronics' engineers planned to design a full-featured, reliable packet TNC that would still be affordable. They wanted to include the features that Kantronics introduced to the market in the KPC-2: KA-Node with forwarding and relay capabilities and the "personal bulletin board system" (PBBS) with all its unique features (message forwarding and reverse forwarding; auto forwarding; remote access; and the ability to edit messages, even remotely). Even with all these features, engineers agreed that the unit would have to be small, since an easy way to reduce costs is to invest less money in smaller cases and smaller printed circuit boards.

In order to keep the unit small but maintain all the features, Kantronics decided to do in firmware what others had done in hardware. This type of modern circuit design approach employs fewer components and is characteristic of all Kantronics TNC's. Traditional (1980's) TNC designs relied on HDLC chips for serial communications of AX.25 packet frames. HDLC chips or state machines, made up of logic and EPROMS, also implemented carrier detect circuits. Rather than relying on the older design approach with a higher parts count, Kantronics incorporated the functionality of these chips into the firmware and eliminated them from the circuit board.

Not only does this reduce the size and cost of the unit, but fewer parts on the circuit board contribute to the overall reliability of the products. A decreased number of board components means a decreased chance for equipment failure. By incorporating several hardware functions into firmware, circuit failures are reduced. The KPC-3, by its outstanding reputation for reliability, proves the benefits of reducing the number of hardware components.

In addition to greater reliability, the lower parts count contributes to the unit's low power needs. While some manufacturers use processors that require high current, Kantronics uses a low-power processor (14 mA). They further minimize the processor's power needs by causing it to wait for an interrupt and allowing the TNC to go into a low power mode until needed. Combined with the processor's low power needs, Kantronics allows a wide voltage range (6-25 Vdc), enabling many of the TNC's to operate on a 9-volt battery for a considerable period of time.

Obviously, the KPC-3 and other Kantronics TNC's are amazingly full-featured packet TNC's. Kantronics has managed to pack a tremendous amount of technology into tiny, little boxes by employing fewer components and incorporating some of the hardware functions into the firmware. Superior technology in a small package indicates contemporary circuit design standards and sophisticated software/firmware capabilities. All Kantronics TNC's offer outstanding features at a low cost, requiring low power, and operating reliably for years after their purchase.

Imagine this much power unleashed by a 9-volt battery. That's the KPC-3.

Kantronics KPC-3

It's one of the smallest TNCs you can buy. One of the least expensive. It uses the least power. And it's extremely user-friendly. Yet it offers enough performance to satisfy even advanced users. The KPC-3 has more than 20K in personal mailbox space that is inexpensively expandable to 100K; it runs on a 9-volt battery, so it's portable; and it's very affordable. So if you've been wondering why packet beginners and veterans alike choose the KPC-3, now you know. Maybe you should catch the same wave.

Kantronics

For more information, contact your authorized Kantronics dealer or Kantronics at 1202 E. 23rd St., Lawrence, KS 66046-5006 913-842-7745 FAX 913-842-2021.

DSP MODEM

Johan Forrer KC7WW

A Low Cost DSP Modem for HF Digital Experimentation--Part I

INTRODUCTION

This article describes an HF modulator-demodulator (modem) that is based on Digital Signal Processing (DSP) principles. A practical approach is shown, rather than the usual terse mathematics that usually accompanies this kind of discussion. This article is intended for those interested in experimenting with HF digital communications using DSP software. A low cost DSP platform is also described for implementing some of the ideas presented in this article including complete source code for a high performance HF digital modem.

What is DSP? To some, this means the manipulation of digital data to extract something meaningful. To the communications engineer, it actually means quite a bit more. Consider the following analogy: As experimenters, many are familiar with analog circuits that uses various interconnected components, such as resistors, capacitors, and operational amplifiers. The constructor uses some schematic or rather, an electrical behavioral model as a reference. Similarly, DSP in the most general sense, is the modelling of such systems in an all-digital domain. This involves sampling of real time signals where its accuracy, resolution, sample rate, as well as a multitude of algorithms plays an important role.

DEMODULATOR DESIGN

With that brief introduction, a little digression is necessary on the background of demodulation, in particular FSK (frequency shift keying) as used on the HF bands. It will become evident later, that this overview is appropriate for both analog and DSP demodulators.

After some experimentation with different types of demodulators, an experimenter soon realizes that the type of demodulator intended for use on HF is generally different than that used on telephone circuits, or that used on VHF. The main reason lies in the nature of the HF propagation. Not only has an HF demodulator have to deal with QRM, QRN, but also fading (QSB), multipath propagation, as well as with a very congested part of the RF spectrum. To design a well-engineered HF demodulator, one must pay special attention to several key factors such as dynamic range, i.e. the ability to work with both very weak and/or very strong signals, Superior selectivity is also required to deal with adverse signal to noise (S/N) conditions.

The area of HF demodulator design has evolved over the years to an almost, universal arrangement. This becomes evident when analyzing the modems of current TNC's (terminal node controllers). This typical arrangement, or architecture, is shown in Figure 1.

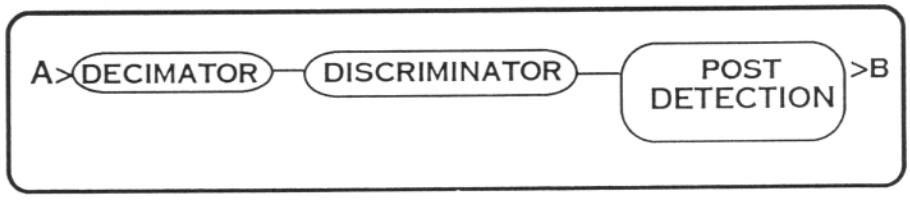

FIGURE 1. CONVENTIONAL MODEL ARCHITECTURE. AUDIO INPUT IS AT (A) AND DIGITAL SIGNAL OUTPUT AT (B).

The discriminator in these conventional designs, typically consists of a pair of filters, one each tuned to the mark and space tones respectively. The envelope of the outputs of the filters arE extracted and combined as shown in Figure 2.

The operation of the demodulator is quite simple. The audio signal containing FSK tones is applied to the limiter at point (A) (please see Figure 1). The limiter produces a constant amplitude, square-wave version of the input signal. One reason for this step is to remove amplitude variations on the FSK signal prior to detection. The function of the discriminator is to convert the input frequency to an analogous DC signal. It is obvious that, when, say a mark tone is present at the input, the mark discriminator filter will leave the mark signal unattenuated, but the space discriminator filter will attenuate the signal severely. The mark filter envelope detector will thus produce the equivalent of a positive envelope (a steady positive DC) and the space envelope detector will produce a near zero level. The combined output thus will be a positive DC level. Likewise if only a space tone is present, a negative DC level will be produced at the output of the discriminator. Such a discriminator will produce a classical "S" response when the frequency is swept between the mark and space tones where the upper part of the "S" corresponds to the positive part of the signal, i.e. the signal passing through the mark filter, while the lower part of the "S" corresponds to the signal passing through the space filter.

The remainder of the demodulator is concerned mainly with post-detection signal conditioning. It should be noted that, besides a DC level shift, the mark and space tone components, i.e. higher frequency components, are also present in the output of the discriminator. These tones are removed by a low pass filter. The remaining task of the demodulator is to threshold and convert the filtered DC levels to appropriate standard signal levels such as RS232 or TTL.

There are of course numerous variations on this basic theme, such as dealing with the efficiency of the various filters, balancing the outputs from the discrimina-

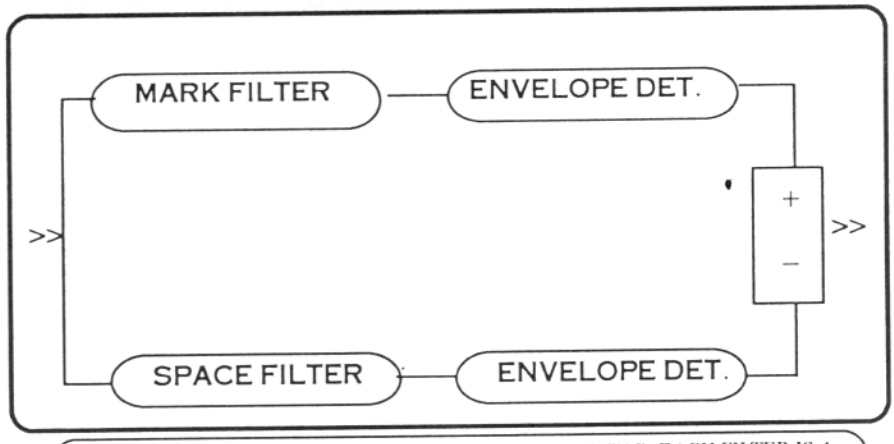

FIGURE 2. A CONVENTIONAL MODEM DISCRIMINATOR. EACH FILTER IS A BANDPASS FILTER CENTERED AT THE APPROPRIATE TONE FREQUENCY. THE FILTER DESIGN LOOSELY FITS THE SPECIFICATIONS CORRESPONDING TO A MATCHED FILTER.

tor to track a small amounts of drift, or tolerate a limited amount of off-frequency operation.

In this discussion so far, the operation of the demodulator is nearly intuitively simple, however, this type of approach is what is known as a matched filter design, i.e. the detection of the tones is by means of filters that loosely matches the characteristic of the modulated tones. The reason why some demodulators perform better than others, even when the same architecture is used, lays fundamentally at the engineering principles of these matched filters. The theory of matched filters, is beyond the scope of this article. The reader is referred to the bibliography for further information.

Before we conclude this overview of demodulator architecture, several general, however, important observations must be made. The first concerns signal phase. Note that any information regarding phase relationships within and between tones are of little consequence and plays no part in the detection process. When this is the case, the detection method is also known as noncoherent detection. One consequence of noncoherent detection is that it requires somewhat more spectral bandwidth and also requires at least twice the shift magnitude than coherent detection. It's advantage is that it's simple and cheap to implement.

The second observation deals with the usage of the limiter stage. This has been a controversy in the past. It was stated earlier that the purpose of the limiter was to remove any AM from the signal prior to detection. It's inclusion also has another purpose that has to do with non-linear characteristics introduced by the limiter. When a non-linear transformation of the input signal occurs, such as in the case of the limiter, the spectral content of the input signal is also modified. Theoretical research from the 1950's and 60's as well as some practical evidence have shown that such a process perhaps may have desirable side-effects in signal capturing capability in the presence of strong competing signals (please see the bibliography for further references).

The third and final observation, also in context of the limiter stage, is dynamic range. Ideally, a demodulator should be able to cope with wide variations in signal levels such as often is the case when QSB is present or when dealing with weak signals. At one instance the signal level may be extremely low, then the next instant it may become very strong. When a limiter is used, it's stage gain should be sufficient to handle all but the weakest of signals. Alternatively, as is used in this particular DSP modem, is to design a linear system with sufficient dynamic range so both weak and strong signals can be demodulated on an equal basis.

THE IMPLEMENTATION OF THE DSP DEMODULATOR

The DSP modem design that follows, employs several of the key components previously discussed in Figure 1, i.e. the matched filter detector and post detection processing. No limiter is used, however, special provision is made to increase dynamic range and provide additional improvement to the S/N ratio through a process of oversampling and decimation.

Most DSP applications involve analog to digital conversion (A/D) of the input signal. The rate at which the sampling and A/D takes place must be chosen rather carefully. As a minimum requirement, the sampling rate must be at least greater than twice the highest frequency present in the audio input. This is to prevent a phenomena called aliasing. The higher the rate the better, however, it must be kept in mind that the DSP must be able to complete its computational tasks associated with each sample before the next new sample can be processed. With first generation DSPs, this typically amounted to approximately 400 to 600 instructions for audio frequencies. If it is found that there is plenty of processing time to spare, a higher sampling rate may be accommodated. This heavy demand on the amount of processing between input samples is one reason why general-purpose processors like the Intel 386/486 are not suited for DSP applications. Second generation fixed point DSP processors, like the TI 320C26 used in this DSP modem implementation, can quite easily accommodate even higher sample rates.

A further consideration concerning the choice of sample rate involves filter order. This factor may influence demodulator performance and usefulness. Larger filter orders at low sample rate generally mean that the signal lingers longer in the DSP and may thus introduce undesirable delays for timing-critical applications such as those in ARQ protocols.

Figure 3 presents the various components as employed in this DSP modem.

DSP HARDWARE

Until fairly recently, DSP development tools, were very expensive and inaccessible to the average amateur experimenter. Recently, however, Texas Instruments (TI) released the TMS320C2x DSP starter Kit, also called the "DSK" (part number:TMDS3200026). For $99, the kit provides a small circuit module containing some DSP hardware, a thick user's guide, and a PC-based software package. All the user needs is a RS232 cable and 9V AC wall-mounted power transformer. This was intended as a low-cost introduction to DSP, and was received with great enthusiasm throughout the DSP community. The demand for the unit is so high that presently there is a world-wide shortage.

The software included a limited assembler, a nice debugger that executed the users' code on the DSP for real time debugging, and some coding examples to get you started. The DSP hardware module is a tiny circuit board measuring only 3.5 x 2.5 inches. All parts are surface-mounted which means that repairs would be very difficult. The DSP is a 40 MHz 320C26 that has 1568 words on-chip static ram and a 256 word factory programmed ROM. At this clock rate, instructions typically execute in 100 ns. The on-chip RAM is configurable in several ways of code and data space configurations. The factory programmed ROM contains a simple bootstrap loader that allows the DSP memory to be loaded either from external memory, or via a RS232 line. The circuit module also contains a TLC32040 AIC that provides for a single channel, 14-bit A/D - D/A with sample rates as high as 44 kHz. The AIC is fully programmable and contains amongst other things, programmable switched capacitor anti-aliasing and reconstruction filters.

Although the amount of RAM appears very limited, it actually goes a long way, in fact enough to implement our matched-filter HF demodulator and synthesized audio modulator.

(Part II of this article will appear next month. Johan can be reached at 26553 Priceview Drive, Monroe OR 97456, or on CIS 7073, 3472).

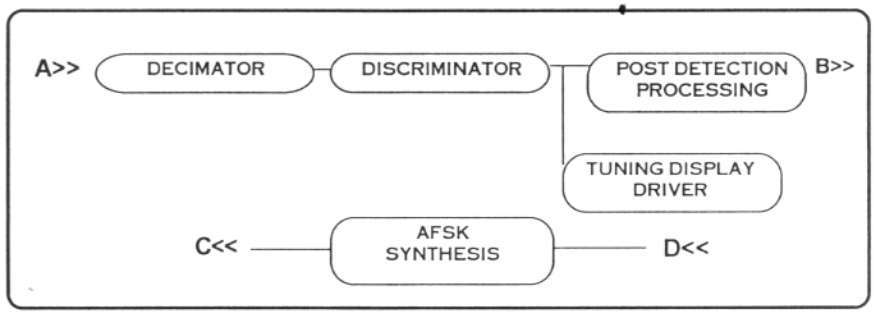

FIGURE 3. DSP MODEM ARCHITECTURE. THE ANALOG SIGNAL (A) IS OVERSAMPLED AND DECIMATED FOR INCREASED DYNAMIC RANGE AND BETTER S/N. THE DISCRIMINATOR CONSISTS OF A PAIR OF MATCHED FINITE IMPULSE RESPONSE (FIR) FILTERS. POST DETECTION PROCESSING INCLUDES LOW PASS FILTERING AND THRESHOLDING FOR DATA OUTPUT (B). A "LED" DRIVER IS PROVIDED FOR TUNING PURPOSES. DIGITAL DATA FOR TRANSMISSION IS APPLIED AT (D) FOR DIGITAL AUDIO FREQUENCY SYNTHESIS. THIS OUTPUT (C) IS SUITABLE FOR APPLICATION TO A SSB TRANSCEIVER MODULATOR.

THE LAST WORD

Jim Mortensen, N2HOS

Address. There is more news from headquarters. We have a permanent box number in Florida. We now have a permanent phone number as well. Please note: this one will be answered "**ADRS.**" And it is a human voice not a computer. The number is **407 677 7000**. Nice number.

While on the subject of addresses, I must make note of my changes as well. On September 10th, I go QRT at the Briarcliff Manor address and will not return to the air until October 16th. The house is sold and, while we will still be spending summers in the New York area, it will be in a smaller house in a condominium settlement 25 miles north of here. The address will be Box 596, Somers, NY 10589 effective 15 September. The new phone numbers are not yet available. Call 914 762 2507 and follow the directions (I hope). On October 15, we return to Florida to the papayas and grapefruit and tangerines . . . and the usual numbers 813 596 3105 fax 596 7473. CIS remains as always **71573,1077**.

The Journal adjusts to a new name, new look and a new schedule! The story began with the August bonus issue. It unveiled the new name--*DIGITAL JOURNAL*--one that reflects the changes in the digital world as well as the contents of the magazine. It has been a long time since we covered only the RTTY portion of the band! And now, like a juggler operating at full speed, we must cover not two, three or four or five modes, but all six! Hope you enjoyed the new cover. The insides will change as well over the next few months as we redesign the look and feel of the Journal.

The new schedule is important. This is the September issue, and it is in the mail in late August!. Yes, from now on, the Journal comes every month, rain or shine, twelve times a year. And it will be in the mail on schedule. Digital activity doesn't stop in the summer so the Journal can't either. Yes, the membership costs will have to increase to absorb this additional service, but not until July 1,1995.

Tower Problems. We think the amateur community has a corner on problems with them. At some point in my career as publisher, I was going to write an article about what I call my "Tower Saga." This touching story involves my heroic and well deserved success struggling against giants like the County and a nosy neighbor who created more trouble than he could handle. No longer. My story was trumped by a front page article in the New York Times--"A TOWER PITS FORDHAM VS. BOTANICAL GARDEN." What a headline. What a story. Seems as though Fordham University was ordered by the FCC to relocate their FM tower some five years ago. Thousands of hours and many dollars later, the engineering studies suggested the best location, one right on the Fordham grounds. Construction on the $1.5 million tower began after every one of the permits, including the FCC's, was obtained. Half way up the planned 480 feet, their neighbor woke up and realized it was going to be an eyesore for at least some of their 500,000 annual visitors. The Garden tried to negotiate with Fordham, then got the New York City Building Department to order a halt to construction. May the best man win! Whoever does, it will have little to do with the law and a lot to do with clout within the New York City jungle.

New Title. Tom WA8DXD became General Manager of the Journal last month. This move recognizes his recent contributions but the increasing load we will place on his shoulders in the months ahead. All business activities now center in his office, including the new phone number mentioned above. He soon takes over from Al W2TKU the membership database as well. Our business affairs will then be centralized for the first time since the ADRS acquired the Journal. Tom will continue to build the Digital Digest section of the Journal each month, of course. By the way, Tom owns a small advertising agency and generously provides us with his organization's talent and services at very affordable prices! The new front cover, logo--all of our new graphics come out of his shop. He is a welcome addition to our group.

ADRS Board meets in late October in Charlotte, NC. The last weekend of the month will be devoted to planning. Every board member is aware of the problems we all now see on the bands. They will be fully informed on the FCC's actions. But will they be aware of your thoughts on the subject? Not if you don't write. Please, now, well before the meeting, take time to write one or more of the directors. Don't waste time gossiping on the air about our problems, do something about it. Write a director today!!!

Tune up your rig courtesy AT&T. Cliff W6HDO reports excellent FEC Sitor/Amtor signals are broadcast around the clock. He says more adjustments can be made in a shorter period of time by tuning to their optimum quality. Tune in at:

WOO	4212.5	6328.0	8433.0	12632.0
WOM	4215.5	6327.5	8432.5	12631.0
KMI	4217.5	6326.5	8431.5	12630.0

22425.5

16870.0 19689.5

Microsoft strikes again. I reported last month on the inability of Word 6.0 to convert Word Perfect 6.0 files, despite their claim. "No problem," said MS, "here comes a utility to handle it." No dice, said I, and it didn't work at all. On the Winword Forum of CompuServe last week was a flash bulletin: "Microsoft is going to write a converter for WP6.0 files. If you have any non-confidential files to contribute for this project, please contact . . ." Truth in advertising!

Next month, learn about remote control of your station from an expert, the DX Top Ten, brand new software, more about BandCheck/BandChart (and how you can get your copy), DX, contests. Don't miss it.

CUL de **Jim, N2HOS** SK ■

CQ World-Wide DX Contest All-Time RTTY Records

By Jay W. Townsend, WS7I

These records have been compiled from data printed in the RTTY Digital Journal. There have been some changes in the rules since the first contest in 1987. After the 1989 test two new catagories were added: Single Operator Assisted and Multi-Multi. Last year a new low power class was started for Sigle Operator-All Band nad Multi-Single. These records do not include those new power catagories as this would have been the baseline year. However, new changes from 30 to 48 hours of contest this year make these the final records of the first era.

For contest records to have value they must be on the same time basis. For the first seven years this has been 30 hours for the single operator. Unfortunately, some felt it necessary to change the time structure which makes record keeping and indeed records difficult.

Congratulations to those who set these records many of which will probably hold even with the change to 48 hours. (At least until the next sunspot cycle.)

RECORD HOLDERS

Single Operator/Single Band

AFRICA

Yr	Band	Call	Score	#QSO	QPts	Zne	Cty	St&Pro
1993	3..5	No Entry						
1988	7	EA8AKQ	12	2	6	1	1	0
1990	14	EA8RA	104,451	315	941	25	46	40
1992	21	ZS6EZ	382,630	772	2,305	27	87	52
1992	28	ZD8LII	355,426	840	2,503	23	66	53

ASIA

1992	3.5	JR2CFD	153	10	17	4	3	2
1993	7	JA2NNF	4,840	49	10	16	24	4
1993	14	JR5JAQ	108,540	297	804	31	71	33
1992	21	JE2UFF	84,588	259	742	25	55	34
1990	28	JR1IJV	123,066	328	954	28	59	42

EUROPE

1993	3.5	S57DX	27,608	232	476	6	44	8
1989	7	HB9DCQ	48,865	224	515	19	49	23
1993	14	S51DX	293,433	700	1,869	30	77	50
1992	21	LZ1MC	247,950	623	1,653	27	70	53
1990	28	4U1ITU	236,842	547	1,499	32	79	47

NORTH AMERICA

1993	3.5	K1IU	39,710	273	418	10	37	48
1993	7	W2UP	125,656	489	904	22	68	49
1993	14	VY2SS	374,550	913	2,270	27	90	48
1989	21	KE0KB	138,205	468	1,055	26	65	40
1990	28	AB8K	96,250	312	770	29	67	29

OCEANIA

	3.5	No Entry						
	7	No Entry						
1990	14	VK3EBP	62,964	198	583	24	48	36
1990	21	YC1YMN	116,051	344	1,027	25	50	38
1989	28	KX6OI	49,572	206	612	18	37	26

SOUTH AMERICA

	3.5	No Entry						
1993	7	YW1A Op. YV1AVO	65,835	243	693	18	34	43
1992	14	4M5RY Op. YV5KAJ	270,256	599	1,778	23	73	56
1992	21	ZP5JCY	433,532	871	2,596	30	85	52
1991	28	ZP5JCY	235,884	599	1,787	23	57	52

Single Operator/Single Band

World Record Holders

1993	3.5	K1IU	39,710	273	418	10	37	48
1993	7	W2UP	25,656	489	904	22	68	49
1993	14	VY2SS	374,550	913	2,270	27	90	48
1992	21	ZP5JCY	433,532	871	2,596	30	85	52
1992	28	ZD8LII	355,426	840	2,503	23	66	53

Single Operator/All Band Assisted

	AF	No Entry						
1993	AS	JA3YBF	221,298	384	958	65	135	31
1993	EU	DL0WW	1,135,575	969	2,575	86	252	103
1992	NA	K1IU	971,412	911	2,028	96	222	161
	OC	No Entry						
	SA	No Entry						

WORLD RECORD

1993		**DL0WW**	**1,135,575**	**969**	**2,575**	**86**	**252**	**103**

Single Operator/All Band

1990	OC	KG6DX	591,839	633	1,867	80	134	103
1990	SA	HC5J Op. WS7I	1,364,972	1,143	3,362	89	185	132
1991	AF	CT3M Op. DJ6QT	1,075,584	941	2,801	82	213	89
1993	AS	UH8EA	911,180	1,166	3,142	67	193	30
1992	EU	GU3HFN	1,223,849	1,081	3,007	80	191	136
1990	NA	TG9VT	1,142,946	1,090	2,702	91	182	150

WORLD RECORD

1990		**HC5J** Op. WS7I	**1,364,972**	**1,143**	**3,362**	**89**	**185**	**132**

Multi-Operator/Single Transmitter

1992	AF	EG8CMR	963,116	1,048	3,127	59	120	129
1993	AS	UZ9CWA	2,580,660	1,716	4,779	120	333	87
1992	EU	UW2F	2,847,220	1,767	4,909	106	271	203
1991	NA	V2/G0AZT	1,680,607	1.577	3,743	78	180	191
1993	OC	NH6T	1,138,070	1,042	3,118	83	130	152
1992	SA	P40RY	3,543,090	2,222	6,635	91	220	223

WORLD RECORD

1992		**P40RY**	**3,543,090**	**2,222**	**6,635**	**91**	**220**	**223**

Multi-Operator/Multi-Transmitter

	AF	No Entry						
1993	AS	JJ3YBB	586,249	684	1,873	79	187	47
1991	EU	LY2WW	927,710	916	2,285	87	236	83
1992	NA	W3LPL	3,111,748	2,233	4,556	116	326	241
1992	OC	T32RA	1,770,131	1,744	5,191	69	118	154
	SA		No Entry					

WORLD RECORD

1992		**W3LPL**	**3,111,748**	**2,233**	**4,556**	**116**	**326**	**241**

Information Superhighway: Part III

Wayne Renardson NZ4W
Amateur Radio and the Digital Revolution

The nature of the amateur radio service has been affected by the digital revolution and the new information highways. As alternative communication paths emerge, the need for the traditional role of the service will vanish. The outcome will result in lost spectrum, diminishing the hobby so it becomes unrecognizable from alternative pathways available to any citizen at any time. Amateurs should raise their antennas and be aware of emerging technologies and learn to use them to improve both the technology and the amateur service.

Ever since the government began regulating the airwaves, the amateur radio service has enjoyed an aura of respect. Most of the good will projected on the amateur radio operator has come about because of public service. The American Radio Relay League (ARRL) was founded to represent an earlier group of amateurs involved in conveying information from point-to-point rather than person-to-person. Messages with news of loved ones, health and welfare traffic, and other public information was relayed from one amateur station to another, finally being delivered to its intended recipient. Today, one of ARRL's functions is the "establishment of networks to provide communications in the event of disasters or other emergencies, for the advancement of the radio art, and of the public welfare..."

In the early days most information was transmitted by voice, CW, or RTTY. The public had limited access to radio and land-line highways. Western Union, with its miles of telegraph lines, was an option, but one limited by the availability of transmitting/receiving stations and the considerable expense, since the company charged users by the word. Telephones were rarely available, and the postal service was slow. Commercial radio and later television gave the public access to information but it did not permit citizens to convey information, either point-to-point or person-to-person. Information was delivered through the filter of the prejudices of the government-regulated broadcast industry to an audience of mostly passive recipients.

When the telephone became omnipresent, person-to-person communication became available to nearly everyone, spanning distances for anyone who could afford long-distance rates. The amateur radio service continued its historic mission of conveying messages for themselves and the public, occasionally providing communications during disasters and emergencies, but the ubiquitous telephone line became the primary means of distance person-to-person communication, both in the business and personal realms.

PACKET A LATE ARRIVAL

American amateurs were slow to move from the analog world of voice to establish digital packet networks. Packet radio, whose protocols were established by the CTITT X.25 recommendation, was in the commercial world and accessible to Canadian amateurs several years before American amateurs were permitted to use it. But once it became available, Americans rapidly established network backbones with gateways to and from numerous sources. With the development of HF digital modes beyond CW and RTTY, it became possible to develop paths between HF AMTOR, PacTor, CLOVER, and now G-Tor stations, and VHF/UHF packet stations, increasing the message handling capability of the amateur service.

Each day the HF bands are full of information being passed to and from such big gun stations as W2TKU and K4CJX. I often keep my AMTOR station tuned to 7.705 mHz mark, buffering the traffic from such regional MSOs as W4NPX and KD4OM. The content of most traffic is such that it could be handled by another service, usually an analog telephone line. AMTOR certainly provided its value during the Gulf War when John TG9VT and Frank Moore, WA1URA/9, conveyed valuable information from people in Kuwait, but the majority of the traffic found on the HF digital modes is neither urgent nor of such import that it could not have been transmitted by other means.

The digital communications revolution, sparked by the personal computer, not only allowed amateur radio operators to enhance their digital modes, but it gave those without access to the airwaves an opportunity to join the party. And when everyone gains the means to communicate person-to-person with anyone, anywhere, anytime, the historic justification for the amateur radio licensee occupying multi-megahertz of finite radio spectrum will evaporate. As Joe Kelly of Cellular One claimed, "I see a national high-speed networking service providing data services to the general public. Most people see these services at school or at work, but never at home. Simplify the interface, tie in the service to the home and business and schools, and you have a shared information base available to everyone."

WIRELESS THE EXPLOSIVE STAGE

While the information superhighway is often conceived in terms of wire, the next explosion is going occur in wireless. People have become accustomed to moving around with their communications, and freedom from wire offers an attractive alternative.

The FCC is auctioning off radio spectrum for a new personal communications service (PCS). Motorola has proposed they limit the number of licenses granted and change airwave allocations to make it easier to offer regional and national PCS. By competing with cellular and SMR radio systems, they hope to offer person-to-person communications at a low cost. And the government hopes to enjoy a healthy income from the sale of valuable spectrum.

The FCC's original PCS order called for 10, 20, and 30 mHz chunks of spectrum to be allocated to seven providers. The latest proposal offers three 30 mHz and three 10 mHz channels, all placed in the same spectrum between 1850-1970, 2130-2150, and 2180-2200 mHz. Numerous petitions have been filed by interested players, so the auction of airspace is still in the future, probably later this year. But for certain, the availability of PCS is going to further erode the amateur radio operator's justification for occupying thousands of mHz of spectrum for passing public traffic.

Note: After this article was written the first round auction was held. The resullts stagger the imagination. Ten nationwide advanced paging licenses netted the government $617 million–twenty times the original estimate! Two licenses sold for $80 million each! Local license auctions yielded another $216 million for a total government take of $833 million. There are two obvious lessons to be learned from this startling development. Spectrum is far, far more valuable than anyone ever imagined. Second, it is needless to point out that Congress has discovered a painless way to raise huge sums of money without raising taxes or "taking" anything from anybody. Look out . . . for it can now be estimated that the authorized spectrum sale could be valued as high as $35-50 billion. Yes, Billion! (Editor)

As cellular digital packet radio (CDPR) evolves, spurred on by such conglomerates as AT&T, Nynex, PacTel, McGraw Cellular, and Sprint, the cost to the users continues to drop. RAM mobile data recently announced that prices to send data would be $25/month for up to 100 KB of messaging, and $75/month for up to 400 KB of information. This article is 17.2 kb or 2650 words long, and would cost about $4 to send anywhere.

Wireless hardware and software products are quickly reaching the marketplace. Companies such as Microsoft Mail, Lotus cc:Mail, WordPerfect Office, and QuickMail are being used to support wireless and big computer companies are

shipping their laptop and notebook machines with bundled wireless support. Dell Computer's new Latitude notebooks ship with CommWorks, as well as a free subscription to RadioMail, and IBM's ThinkPad offers wireless connection. But others are in the market as well.

In what appears to be an outgrowth of it's paging system, Motorola calls its computer EMBARC, focused on storing and delivering personal messages, news, and information services automatically. Messages can be timed to be delivered in 15-minute, 1-hour, 3-hour or overnight increments, according to priorities. E-mail messages can be sent to thousands of people simultaneously, and such services as USA Today, weather, and business reports can be delivered to your computer daily, unfettered by its location or even whether it is turned on. Messages can also be delivered via the EMBARC central switch that uses a CCITT X.400 message handling protocol that will store, encode, and uplink them to a satellite for downloading delivery to a regional transmission site. There they are retransmitted on 931.9125 mHz to the appropriate NewsStream receiver for forwarding to your computer via the RS-232 port. If your computer is turned off, the receiver has a 56-message buffer so you can retrieve your traffic at a later time. Aimed at the business user, the package assumes you have a DOS-based desktop, laptop, or notebook computer and includes one NewsStream wireless data receiver, and an RS232-DB-9 cable for the receiver to computer connection. Software from EMBARC is included in the $395 package. There is also a package available for Hewlett-Packard users at $458. The basic service is $15/month, and there are numerous features and cost factors to consider depending on usage. Additional information from EMBARC Advanced Messaging, 1500 N.W. 22nd Avenue, Boynton Beach, Florida, 33426-8292 or by calling 1-800-362-2724.

NETWORKING BOTH VOICE AND DATA

Ericsson GE takes a networking approach, but to understand its philosophy, some background is necessary. In their white paper discussion of wireless computing/communications, William Frezza suggests that no single technology can meet all the requirements for portable computers to access what should be the ultimate goal of wireless computing--any piece of information at anytime from anywhere. Frezza believes that wireless networks are limited in geographic distance by (1) the nature of radio waves and propagation, (2) system architecture, (3) FCC regulations governing spectrum use, and (4) the depth of commitment and willingness to invest money in establishing the network. As if there were not enough acronyms, the present options appear to be various ANs describing different types of wireless networks. The wireless Wide Area Network (WAN) covers the continental US, the Metropolitan Area Network (MAN) connecting sites in major US cities, and Local Area Network (LAN) connecting computers and work stations in one or more buildings within a small geographical area such as a university campus. Frezza says the majority of the current technology and development is invested in MANs to support the out-of-office worker whose productivity depends on the availability of information. MANs consist of two types--circuit and packet-switched networks. Circuit-switched networks support voice traffic while packet-switched networks support data. Both architectures are necessary since circuit-switched is superior for file transfer activity while packet-switched is better at supporting interactive message handling.

Voice networks have been licensed by the FCC since the 1930s under the Private Radio Bureau section, which licenses commercial, business, and public safety concerns, all of which had to operate and maintain their own AM/FM radio systems. The public has not really had a wireless network available until the cellular telephone and Specialized Mobile Radio (SMR) systems emerged in the 1980s, and due to FCC regulations, they do not have to manage their own systems. For this reason, Frezza envisions public networking as the key to the future of wireless portable computing, and Ericsson built their network on this philosophy.

Ericsson calls their system Mobitex. A public, packet-switched wireless data network designed to provide seamless, nationwide roaming, Mobitex is already operational in the US, Canada, the UK, Norway, Finland, and Sweden. Computers can access the network through 8-kbps packet radio modems. Mobitex uses a hierarchical structure to achieve broad coverage by routing traffic first through a local, then to a regional and finally a national switch. Traffic is routed up the network until the caller and receiver are within a common branch, where linking and contact take place.

Mobidem is Ericsson's portable wireless modem that physically resembles your HT without the TT pad. It can be connected to any PC that has an RS-232 or serial port for linkage with other networks and databases at a data speed of 8-kbps, all without having to find a telephone connection or RJ-11 jack. Operating with only two buttons, an off/on switch and a mode switch for saving battery power, it weighs 470 grams or slightly less than a pound. Using a scanning function, it roams the band looking for incoming traffic. The unit beeps to alert the user when traffic is received. Messages can be read or saved for later viewing. If your PC is turned off, the unit will still store messages in its 8k byte (16 packets) buffer for later retrieval. Using RF in the 896-902 mHz (Tx) and 935-941 mHz (Rcv) range with a 12.5 kHz channel separation, the unit has 480 different channels available. The transmitter radiates 2 watts output into 50 ohms using a modified GMSK modulation. Data is sent with Ericsson's Mobitex asynchronous communications protocol in full duplex. Several software programs are available, supporting both DOS and UNIX platforms.

Ericsson associates a subscriber's phone number with a person rather than a fixed address, so the network can locate the user anywhere within its geographical range. When mobile, the user simply lets the Mobidem scan for a frequency and once found, the user is automatically registered with the local base station.

The unit is housed in a rugged plastic case, has an LED to show signal strength and battery condition, and comes with a collapsible antenna. Present prices vary but they offer a package containing the modem, a battery charger, a Hewlett-Packard 95LX palmtop, Radio-Mail software, and a zipper carrying case for $1995. If you use your computer, the cost of the kit without the HP 95LX is $1495. For additional information on the HP-95LX, see Jonathan Mayo's review in the March/April issue of Digital Digest. The stand-alone Mobidem is $1395. Users can try the kit for 90 days before payment is required. There is a $99 activation fee and a fee of $89/month for unlimited wireless messages. Additional information can be obtained from Ericsson GE Mobile Communications Inc., Wireless Computing, 15 E. Midland Avenue, Paramus, NJ 07625 (201)265-6600, Fax (201) 265-9115.

INTERNET--AGAIN

Are you interested in logging onto a system with your PC that will allow you to carry on a conversation with someone in Germany about the finer points of Jungian psychology or find out what's the best shoe to wear while doing cross-country racing? Looking for access to the Internet, where every imaginable sort of discussion is taking place? Internet is a consortium of government and academic computers linked together to exchange information. Once privately owned, the network is now accessible to us courtesy of PSILink Basic, a company trying to bring Internet to the public arena. Making use of their own software, PSILink can be reached from 160 US cities via a local number. In addition to Internet, you can send unlimited amounts of e-mail on such commercial BBSs as GEnie, AOL, Bix, and MCI Mail. It also provides reading and posting privileges on UseNet, the largest BBS in the world carrying thousands of forums with subjects ranging from polar bears to vertically polarized antenna.

After a basic charge of $19 and a $1 MB charge for downloads above the monthly limit, the cost of the service is $29/month for 1200 to 2400 bps or $39 for 9600 bps modems. The service allows you to download 50 mb of binary files and 50 mb

of Usenet files monthly and charges $1 a mb for exceeding the limit. Using File Transfer Protocol (FTP), users have access to and can download software and reference documents from thousands of computers world-wide. Additional details from PSILink Basic at 11800 Sunrise Valley Dr., Reston, VA 22091 or by calling 1-800-827-7482 or 703-620-6651.

EMERGENCY COMMUNICATIONS

Another way the amateur radio service has justified it's licensing privileges has been emergency communications. When all else failed, the amateur service was ready to provide vital links between places and people, conveying necessary information that often saved lives and property. With the explosion in cellular telephony, the historic justification for the amateur service has been overshadowed by events. During the recent Los Angeles earthquake, most of the communication was handled by cellular telephone.

The California Highway Patrol (CHP) Golden Gate Communication Center fielded 80,000 calls for emergency assistance with 25,076 (31.3%) from cellular phones. In 1987 the Massachusetts state police fielded about 300 cellular calls a month. By the end of 1992 that number had grown to more than 15,700, an annual increase of more than 1000% Having worked in an emergency communications center in Nashville since 1979, I can attest to the large number of cellular phone calls received daily. I can count on one hand the calls from amateur radio operators during the past ten years. And when it comes to planning for emergency communications during a major disaster or power outage, amateur radio is not even a consideration. Many of the planners carry cellular telephones, and have laptops that which link them to backup systems in case of disaster.

The onus lies with the amateur radio operator to not only become familiar with the various elements comprising the information and digital highways, but to adapt to them in order to become part of the emerging data paths. Amateur radio opherators, particularly those involved in the the digital modes, possess the knowledge and the skills to make valuable contributions to the ongoing revolution in communication. In order to survive as a viable service, we must continue to make contributions to the medium and demonstrate that the amateur radio service is not obsolete.

This concludes Wayne's look at the information Highway. See "Hits & Misses" for additional details about the value of the auctioned frequencies.

Section 97.109 is amended by revising paragraphs (d) and (e) to read as follows:

97.109 Station Control

(d) When a station is being automatically controlled, the control operator need not be at the control point. Only stations specifically designated elsewhere in this Part may be automatically controlled. Automatic control must cease upon notification by an EIC that the station is transmitting improperly or causing harmful interference to other stations. Automatic control must not be resumed without prior approval of the EIC.

(e) No station may be automatically controlled while transmitting third party communications, except a station transmitting a RTTY or data emission. All messages that are retransmitted must originate at a station that is being locally or remotely controlled.

97.221 Automatically controlled digital station.

(a) This rule section does not apply to an auxiliary station, a beacon station, a repeater station, an earth station, a space station or space telecommand station.

(b) A station may be automatically controlled while transmitting RTTY or data emissions on the 6 M or shorter wavelength bands and on the 28.120-28.189 Mhz, 24.925-24.930 Mhz, 21.090-21.100 Mhz, 18.105-18.110 Mhz, 14.0950-14.0995 Mhz, 14.1005-14.112 Mhz, 7.100-7.105 Mhz, or 3.620-3.635 Mhz segments.

(c) A station may be automatically controlled while transmitting a RTTY or data emission on any other frequency authorized for each emission types provided that:

(1) The station is responding to interrogation by a station under local or remote control: and

(2) No transmission from the automatically controlled station occupies a bandwidth of more than 500 Hz.

(Extracted from the the June 23 FCC NOPRM. For full text see the August QST. Please note the subband frequencies are those agreed to by the IARU, Region 2).

DIGITAL DIGEST

Tom Arvo, WA8DXD
News, Views , Tips & Reviews

OPINION

A few comments on your recent "no bandplan" article. I wholeheartedly agree that the last thing we need is some sluggish bureaucracy, be it volunteers or the government, making "unmovable" decisions. Let us not forget the years that the U.S. hams were relegated by law to RTTY while the Germans worked on amtor and the Canadians on packet. With a little common sense I think our digital hams can sift things out pretty well on their own.

One of the biggest things our transceiver manufacturers can do to help the situation is to provide some means of selecting narrow (perhaps 500 Hz) filters while in the SSB mode. I personally think that a narrow filter is the biggest thing that can be done to improve digital performance, from the standpoint of reducing interference as well as reducing the signal to noise ratio. Those new DSP audio filters may help but they are inserted far too late in the receiving chain to be really effective. Filters in the receiver IF are what is really needed so that interfering signals are eliminated before they can impact such things as the AGC. It would also be real nice to have a "digital mode" switch that would route the receive and transmit audio signals to the rear panel of the transceiver via separate level controls (rear panel screw driver adjustment). That would help prevent overdriving the transmitter because once the level was properly set for your TNC it would stay put regardless of what you did with the front panel microphone level control. It is also real nice to be able to adjust the speaker volume to a comfortable level (or turn it completely off) without affecting the drive to the TNC.

On the subject of filters, those who use 3 Khz wide SSB filters on amtor and pactor need to realize that if someone is equipped with a 500 Hz filter he may find what to him is a completely clear frequency on which to operate. If your receiver is 3 Khz wide then you are listening to a lot more spectrum than what is necessary to receive your desired signal. The result is often that he interferes with you while not even realizing that you are there. Don't go jumping down his throat for not listening before he transmits. Given our crowded band conditions, I don't think it is reasonable to ask everyone to leave 3 Khz of unused guardband between signals just in case someone is not equipped with filters suited to their mode of operation. That would be akin to asking all SSB operators to leave 6 Khz spacing just in case someone out there is still using a receiver with AM filters. On the other hand, if you have a QSO in progress and you politely explain your situation to the other operator he will likely move to accommodate you regardless of what type of filters you are using.

—de Robert W. Lewis, AA4PB

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I wish to say that I agree with the ADRS's decision to oppose HF band planning. I can tell as can any active amateur that HF digital operation is growing and to some extent CW operation is declining. As I said in my previous letter, I enjoy both digital and cw. I think that CW will always be around because of the real enjoyment it brings those of us who like to use it. Digital operation will continue to grow, however, and a band plan will not provide the flexibility needed to accommodate that growth in a orderly fashion.

I do support the various "gentlemen s agreement" band occupancy arrangements that we find today. I would like to see the digital ones mentioned in the "Journal" occasionally. I didn't find anything on that in the "Journal" for several issues after I first got on AMtor and then only recall a brief mention in one of the columns.

Now for the concern that prompted my first letter. The deliberate interference you commented about is of course disgusting as well as illegal. Fortunately there is very little of that. I am certain the interference I spoke about in my letter was not deliberate, but accidental. I believe that 99.99% of amateurs will do their best to avoid coming on a frequency that is in use. Operators looking for a unused frequency among those used by AMtor. PACtor, Packet, Clover, and G-tor will of course know within a few seconds of listening if a frequency is unused.

When, however, these operators find their usual haunts busy and begin to look in the RTTY or CW portions the "hidden transmitter" problem can exist. I'm not sure how one might inquire, "is the frequency in use?" in an RTTY area. Perhaps a burst of 15 or 20 FEC characters. then listen for a short burst of RY by the station hearing the interference. I believe that in time most RTTY operators will switch to the superior ARQ modes, but in the meantime this matter could be addressed in the Journal.

When looking for an unused frequency in traditional CW areas I would advocate the time honored "QRL?" in CW a couple of times. If no response is heard I would feel perfectly comfortable in coming up with digital operation on that frequency. There could well be a better way to accomplish this and I would like to see it discussed in the Journal.

—de James Scott, W9KV

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The Digital Journal for HAM-Greenhorns? . . . My name is Juro, I am age 45, and a radio electronic engineer for the last 18 years, acting as Ship's Radio Officer with Czechoslovakia Ocean Shipping, Prague. I have been an RDJ reader for the past 2 years. Reading your PACTOR column in RDJ, March/94, I'd like to give you my opinion to the "question of the simplicity" (RDJ, Mar/94, PACTOR, p.23, FEEDBACK)

I don't understand the question at all! I mean, I do not understand WHY you believe that the readers of a specialized magazine like RDJ, are HAM-greenhorns? Do you really believe we don't know hints like "how to connect your TNC to the TRX"? Please be so kind and let me know where you seem to get the idea that RDJ-readers have an incredibly low technical level of knowledge.

In my opinion, beginners will subscribe to QST or CQ or similar, colorful, "thick" magazines where they can find info on the whole HAM-scale. RDJ readers are a group of well experienced, DIGI-mode users, who want to update their knowledge. Don't you think so?

I hope you don't have any bad feelings toward me for my criticism. Please understand that a RDJ subscription puts at least a ten times bigger load on my budget, as it does your U.S. ham subscribers, and I do not expect to waste my money for worthless pages.

—73. Juro, OM3EW

Translation Please!

I am often asked... "What is the meaning of the term SAN when in QSO with JA operator?" The answer is not an easy one and perhaps not possible to explain. The only possible answer is that it is a polite expression of affection and very convenient. It may be correctly used regardless of gender, age or position in life. But "Bob san"is a double expression since the nickname already adds an intimacv not present in the given name of Robert. Thus, "Taka" is a more friendly form of address to me than "Taka san". It is a mystery!!! Hi. De Taka, JA3BN

--From JA3BN (liberally translated)

MINI REVIEW

By, Phil Sussman - KB8LUJ • P.O. Box 31 • Clayton, Ohio 45315

Today we look at the DSP-9+, an audio noise filter, for VOICE, CW, and DATA. This unit employs DSP technology to reduce random noise (static), filter multiple tones by notching (tone noise reduction), and provide bandpass filtering. The unit is housed in a nice 6.0 x 6.0 x 1.75 inch (153 x 153 x 45 mm) case and weighs about 32 oz. (0.9 kg)

INSTALLATION
Hookup is quick and easy. The unit requires 12 vdc @ 1A. Good regulation is highly recommended. If you hook to power from your rig, be sure the power supply can deliver sufficient current.

The DSP-9+ hooks between your rig and an external speaker. One cable is needed from the rig audio output to the DSP-9+ AUDIO INPUT and a second is required from the SPEAKER OUTPUT of the DSP-9+ to the external speaker. When connecting to a TNC, the audio input from the rig to the TNC can either be connected across the SPEAKER OUTPUT jack of the DSP-9+ or to the LINE OUTPUT jack of the DSP-9+ at 600 ohms (which is NOT controlled by the DSP-9+ volume control). The last RCA jack is used for PTT input (PTTI) which bypasses the DSP-9+ in the CW mode and mutes the speaker in VOICE or DATA modes. Shielded cables are a must to minimize RF interference.

A series of internal jumper options are available. When used for DATA it is important the center frequency of your TNC (modem) match the SAME CENTER FREQUENCY in the DSP-9+. In my test set-up, I used an ICOM IC-751 wired for FSK and high tones. (2100/2300Hz)

OPERATION
Since the unit receives audio from the rig speaker output, it is important not to OVERDRIVE the DSP-9+. For proper operation, the rig volume should be set high enough to make the NORMAL LED light or flicker, but not high enough to illuminate the red OVERLOAD LED.

I tested all three modes, VOICE, CW, and DATA, noting sensitivity and selectivity of the filters. This unit really measures up. I was surprised by the superb results offered to the rejection of noise and carriers when operated on voice. It knocks nighttime 80 meter background static down considerably. It has to be heard to be believed! I was very impressed.

There are four data selections, RTTY, AMTOR, PACTOR, and HF PACKET. Each selection increases the bandwidth. Here's what I found:

1. This filter is SHARP. If you try to tune an AMTOR or PACTOR signal in the RTTY position, it will work. BUT, the BER (bit-error-ratio) rises significantly.

MODE: Voice		MODE: CW		MODE: DATA	
POSITION/Bandwidth		POSITION/Bandwidth		POSITION/Bandwidth	
Normal	2.4 KHz	*CF Hi/Lo	600/800 Hz	HF PR/GTOR	540 Hz
Medium	2.0 KHz	Wide	500 Hz	PACTOR	440 Hz
Narrow	1.6 KHz	Narrow	200 Hz	AMTOR	340 Hz
		Sharp	100 Hz	RTTY	250 Hz

(*)=Note: Center Frequency can be set to 600 Hz or 800 Hz (defaults)

2. In a linked ARQ mode (AMTOR, PACTOR, GTOR) it is best NOT TO CHANGE the filter sharpness once a link has begun. There is a 10ms delay which is enough to destroy the phasing of most links. Likewise, using the BYPASS switch is discouraged for the same reason.
3. Use of the AGC (automatic gain control) is possible in all modes, but dynamic noise reduction is only possible on VOICE and CW modes, and tone noise reduction (multiple automatic notch) only works on VOICE.
4. When used with DATA applications, I routinely achieved a minimum of 3 db improvement in the Signal-to-noise ratio.

MY WISH LIST
Here's a product where negatives pale compared to benefits. However, there are a few small items that caught my attention.

The manual consists of 16 pages printed on 8 1/2 by 11 paper. It lacks pictures or drawings of the unit, both front and rear, which would really help users to identify the buttons, features, and functions. In addition, a good theory of operation is lacking. My typical complaint about lack of three ring hole punching applies, too. I am a nut about grounding. Adding a ground point may be a good idea. RF can get into the unit, especially with the AGC engaged, but the PTTI input can be wired to silence the unit, if necessary.

You need to be careful not to short the audio output. Remember the 1/8 inch (3.5mm) headphone jack is wired for a STEREO plug. What about adding a resistor to both high sides of the jack to avoid the problem.

There were no cables, connectors, or power supply included with the unit. Male RCA connectors are usually not hard to find; but there is such a variance on concentric power connectors, that it might be a good idea to include a male power plug with each unit.

A paper tag is pasted to the bottom of the unit, indicating the software version and serial number. After a couple of weeks the paper was curling at the edges. With such a fine unit, a nicer, more durable tag could be used. I don't like having the serial numbers so easily removed.

ATTA BOY ...
Timewave has given a lot of thought to the art of DSP as applied to digital filters. I am impressed with the fine list of specifications. The solid construction and good design include quality connectors with excellent attention to detail. The unit offers superior performance yet is simple and easy to use. Good filters, superb design, and good physical construction combine to provide a unit most worthy of your attention.

There was no problem with the unit overheating after leaving it turned on continually for weeks. Neither did it lock-up at any time. When it comes to DSP filters, this unit is one of the best. You certainly won't be disappointed with this unit in your shack.

The Timewave DSP-9+ is available from Timewave Technology Inc., 2401 Pilot Knob Road, St. Paul, MN 55120 USA. Phone: 612-452-5939, FAX 612-452-4571. The retail price is about $200.00US.

—de Phil, KB8LUJ

Amateur Radio Software for Commodore Amiga

Discover the World with your Amiga and this 12 disk collection of public domain and shareware Amateur Radio related software. Learn Morse Code with morse trainers. Explore Packet Radio with Amiga Packet software. Plus, you will find electronics designers, SSTV, WEFAX, MINMUF, contest loggers, and much more.

A set of 12 disks of Ham, SWL, and Electronics related PD and Shareware software is available for $29.95 (includes shipping). Or individual disks are available.

To order, send check or money order to "Kinetic Designs, P.O. Box 1646, Orange Pk, FL 32067-1646". Include your name and address, requesting "Amiga HAM 12Pak". Or send a self-adressed stamped envelope requesting "Amiga HAM catalog" for more information.

TAP Publishing Launching New Ham Radio Shopper

(Crossville, TN)—Billed as "The Ham Radio MarketPlace" and targeting more than 640,000 licensed ham radio operators, a new subscription "shopper" magazine, Amateur Radio Trader, was launched in August by TAP Publishing Company.

"Amateur Radio Trader is unlike any other ham radio publication," said Cosby Stone, publisher. "This will be the world's most comprehensive resource for ham operators, where buyers and sellers will come together. It's like holding a hamfest in your hands," he continued, "with everything that keeps the ham operators in touch."

Among the new magazine's features, according to the publisher, will be current pricing and product availability for readers, because of the twice a month print schedule. Low subscription and ad rates, acceptance of all major credit cards, and last minute placement of ads by mail, phone or fax are other features. Hamfest ads will be printed free of charge.

For more information, subscription and advertising rates, contact:
Nick Smith, WA4GKM, Editor at 1-800-774-2623.

Kantronics' KPC-9612

9600 and 1200 Baud at the Same Time

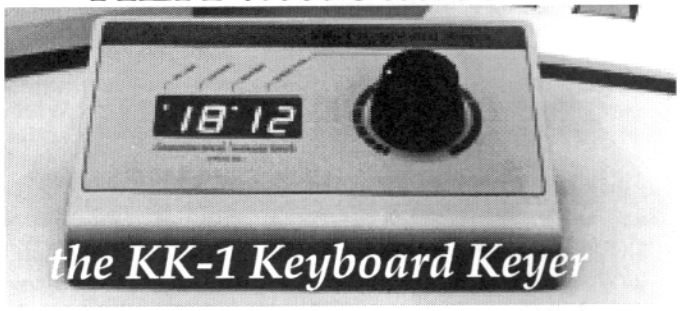
Another Kantronics Dual-Port TNC

In the same price range with single-port 9600 TNCs, this dual-speed, dual-port TNC can send and receive messages at 9600 and 1200 baud at the same time. With two modems and two radio ports, the KPC-9612 can be cabled to either one or two radios. If cabled to only one radio, the KPC-9612 automatically detects the speed of the incoming signal and can receive and transmit either speed.

Available with either 32K or 128K of battery-backed RAM, the KPC-9612 incorporates the Kantronics full-featured PBBS and has KA-Node capability. Like the KPC-3, the KPC-9612 is very small and portable and can even run on a 9-volt battery. Even with all these features, it still requires less than 45 mA while other models require 400 mA or more! Although similarly priced, no other TNC provides these features.

To help users get started, we include two simple terminal programs for the PC. Size: 0.8 x 6.2 x 6.1 inches (2.1 x 15.8 x 15,5 cm). Weight: 15.5 oz. (0.44 kg). Power supply requirement: <45 mA at 6 - 25 Vdc. For more information, contact the dealer nearest you or Kantronics, 1202 E. 23rd Street, Lawrence, KS 66046; Tel (913) 842-7745.

AEA introduces



the KK-1 Keyboard Keyer

Now AEA puts the world at your fingertips...literally...with their new KK-1 Keyboard Keyer. The KK-1 turns any standard PC-compatible 101-key keyboard into an easy-to-use, feature-packed Morse machine. Using the provided cable, the KK-1 will even share a keyboard with your computer. A simple key combination switches the keyboard between the keyer and your computer.

The KK-1's extensive features take full advantage of the keyboard's lay- out. For example, the separate numeric and cursor control keypads are used for accessing the majority of functions. The function keys let you select the twelve nestable message buffers with a single keystroke.

Unique features, such as short-term memory and message repeat, make the KK-1 versatile and easy to use. Hone your skills with an extensive code practice mode that allows you to choose between commonly heard words and random character groups. A built-in iambic keyer allows you to choose paddles for a change of pace.

Other unique features include:

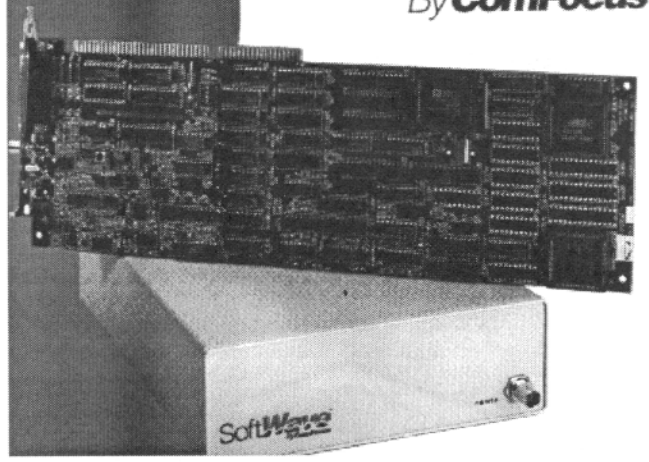
- A four-digit LED display with mode indicators.
- Adjust character formation speed and average sending speed together or independently.
- Nineteen weight setting to compensate for transmitter keying characteristics, or to give yourself a distinctive fist.
- With more useable features for your money than any other Morse keyboard, the KK-1 continues AEA's tradition of top-notch keyers.

Suggested retail price for the KK-1 is $199.00.

For more information, contact your local dealer or
AEA, P.O. Box C2160, Lynnwood, WA 98036; Tel: (206) 774-5554

NEW PRODUCTS

SoftWave™ By ComFocus



Six Receivers on a PC Card!

Softwave is the first fully integrated digital communications receiver for Microsoft Windows. Softwave combines a high performance receiver, digital signal processor, spectrum analyzer, multi-mode demodulator, database and Windows program in one product.

SIX RECEIVERS IN ONE include user selectable:

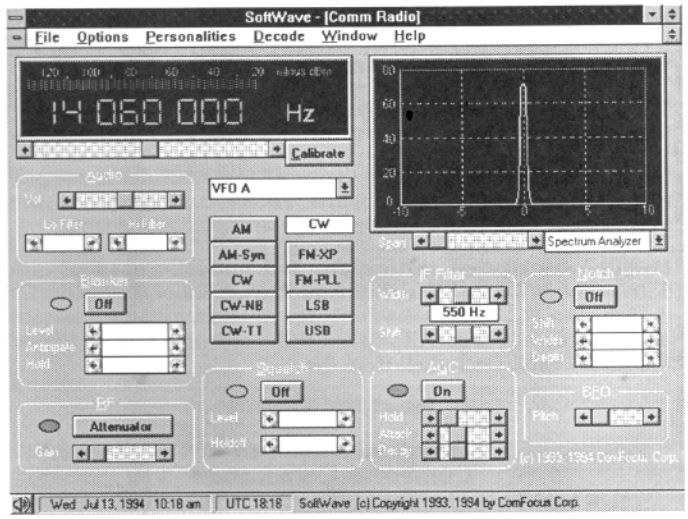
• AM DX Radio • World Radio • Communications Radio
• Time Synch Radio • VHF Radio • Wideband Spectrum Analyzer

The AM DX Radio is linked to SoftWave's database, including the current FCC AM Broadcast Database. Identify any distant station with a few clicks of the computer mouse.

The Communications Radio is designed specifically for the serious shortwave listener. Continuous coverage from 0.5 to 30 MHz. Completely digital controls include volume, high and low f ilters, AGC, blanker, squelch, IF filter bandwidth, notch filter and more. The spectrum analyzer displays the received signal and IF filter characteristics in real time right on the screen. Choose from 46 IF filter settings and set the notch f ilter attenuation up to 60 dB. Search the database for what's on the air now or select "Auto Tune" as you scroll through the listings.

The VHF Radio receives signals from 108 to 174MHz. Scan your own custom database at a rate of up to 100 stations per second. Store thousands of stations in customized scanning groups,

Continued on page 28



National Capitol DX Association Announces Winners of DXCC Field Check DX Hunt

665 Countries Collectively Worked (many on RTTY) by 3 NCDXA Members; from L to R -- WC4B, Dave Hammond (201), K6IR, Ken Miller (227) and ARRL Director N4MM, John Kaode (237) -- Plaques were also awarded to each NCDXA club member who worked over 200 countries during the 12 month duration of the contest. Other qualifying club members included: N4MM(237), K6IR(227), N3II(222), W3UJ(216), WA3DVO(215), N4YKD(215), W3GG(208), W3GOH(206), WC4B(201), WE6H(200), N3TO(200) -- *submitted by Ken, K6IR*

Continued from page 27

Using a colorful map and SoftWave's database, the Word Radio lets both novice and experienced listeners "hear the word at a glance." Most of the digital controls are removed from the screen and operate in the back- ground automatically, allowing the novice a user friendly shortwave experience.

The Time Synch Radio automatically displays the signal strength of the primary WWV broadcasts. Select the strongest signal and hear the accurate time. You can even set your computer clock in local time and UTC Using the WWV signal and SoftWave's digital signal processing, you can calibrate the receive frequency to less than 1 ppm.

The wide band Spectrum Analyzer displays all signals in bandwidths from 200 kHz to 5 MHz. This is great for investigating band activity.

Listen to Morse code and watch the screen as the decoded text appears on the Morse Code Translator. SoftWave tells you the transmit speed in words per minute, the error rate and relative signal quality.

Detailed installation instructions and operating manual make Softwave easy for the PC or shortwave novice. Simply install the DSP card in your PC, connect the SoftWave receiver, install the software and you are ready to go. All power is delivered to the receiver through the RS-232 cable (included) from the PC.

Price Class: $1469.00

For more information contact:
ComFocus Corporation
6160 Lusk Blvd., San Diego, CA 92121 • Tel: 1-800-763-8983

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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

CQ Magazine, The Radio Amateur's Journal —If you enjoy ham radio, you'll want CQ. Published monthly, CQ brings you the best writers for some of the finest reading in Amateur Radio. Subscribe now and save up to 35% OFF newsstand prices! One year $24.50 U.S., $27 Canada/Mexico; Foreign Air Mail $82. Contact CQ Communications, Inc., (also publishers of Popular Communications, ComputerCraft, Electronic Servicing & Technology and numerous amateur radio books/videos), 76 North Broadway, Hicksville, NY 11801, Phone (516) 681-2922 or FAX (516) 681-2926.

RS-232C and COM PORT booklet: This is a compilation of all articles published in past issues of the RTTY Journal on these two very important topics. If you are using a computer in conjunction with Ham Radio, you will find this booklet an invaluable tool to have in your shack. The booklet contains information about COM ports 1,2,3 and 4 as well as the RS-232C information. Send $5.00 to the ADRS, PO BOX 2550, Goldenrod, FL 32733 and you will receive a copy of this invaluable booklet by return mail, postage paid.

What is your TNC doing? A book about how packet radio works and how to to make it work better. Author; KA5ZTX. Publisher: zm xpressions 913-842-6808. Available at amateur radio stores.

For Sale - AEA PK-64 with HF modem, Commodore C-64, disk drive, printer, Sanyo monitor, all cables and documentation. Worked DXCC and WAS RTTY with this gear. Sold as a system only $175.00. Dovetron MPC-1000R-II $250.00. Barry Fox, W1HFN, 431 Mulpus Road, Lunenburg, MA 01462 Ph: (Days) 603-889-6600 Ext 320 (leave voice mail if not there); (e-mail) fox@imagitex.com (eves) 508-582-7521.

For Sale - PCI-4000 HAL CLOVER board. Complete with cables and software. $600, I ship. Certified check or Money Order. Gary Kaehler, W7DCR, P.O. Box 750 LaPine, OR 97739; 1-503-536-3153.

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

PCI-3000, PK-232 and RTTY/CW SOFTWARE FOR IBM-CP! With new features like Termianl Emulator window for TNC for DX Cluster! Contest features include ON-THE-FLY duping! CompRTTY 11/PCI uses bus interface on PCI-3000. CompRTTY II/PK uses host mode of PK-232 for complete control. CompRTTY 11/STD is for all other TUs. Supports COM3/COM4. Full editing of both transmit and receive text! Instant mode/speed change. Hardcopy, diskcopy, break-in buffer, select calling, text file send/reoeive, customizable full screen logging with duping, 24 programmable messages. $65.00 Send call letters (induding MARS) with order. C.O.D. add $3.00 - Call (315) 469-6009, or send check to: David A. Rice, KC2HO, 4452 Ashfield Terrace., Syracuse, NY 13215

RTTY CONTEST SOFTWARE: This is the program used by WINNERS. RTTY by WFIB 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) 823RTTY for fact sheet. IBM-PC, $41.95 (US/VE) $44.95 (DX). Specify disk size. Wyvern Technology, 35 Colvintown Road, Coventry, RI 02816-8509

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Have You Updated Your TNC, Yet?

Last December, AEA released Version 7 firmware for the PK-232MBX, PK-900, DSP-1232 and DSP-2232 multi-mode controllers. With the new firmware, you'll have these new features available to you:

- AEA packet "node" helps eliminate the need for digipeating;
- Enhanced AMTOR- and PACTOR-listen modes show link and connect attempts;
- Automatic selection of AMTOR or PACTOR modes when the **ARXTOR** command is used;
- Enhanced packet **MHEARD** function identifies TCP/IP, NET/ROM and <The-Net> stations;
- **MYALIAS** has been expanded to enable the "two-ham family" to use more than one packet callsign with their PK-232MBX;
- PACTOR "roundtable" operation has been enhanced with the **PTROUND** command;
- **EXPERT** command abbreviates the command list for easy viewing and selection;
- **MOPTT** command simplifies full break-in CW operation.
- SIAM (SIgnal Analysis Mode) now identifies PACTOR stations.

If you own a PK-900 or DSP-2232, you'll also get:

- Cross-mode Gateway includes packet/AMTOR, packet/PACTOR and packet/packet operation.

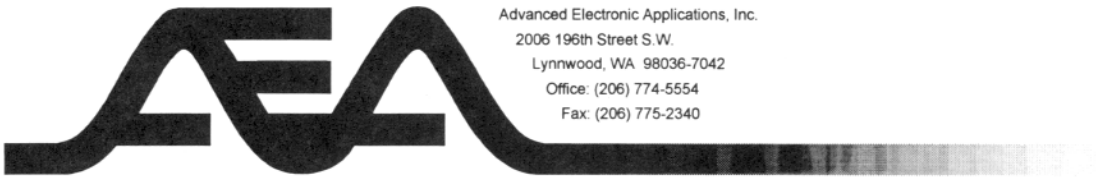
...and for the DSPs:

- The STEP command now works to correct Doppler shift with satellite modems 13 and 44 (and Modem 23 for the DSP-2232.)

The price breakdown for the new firmware is:

Device	**Purchased before 11/15/93**	**Purchased between 11/15/93—12/15/93**	**Purchased on—or after—12/15/93**
PK-232	$100.50 (daughterboard)		
PK-232MBX sans PACTOR	$80.50		
PK-232MBX with PACTOR	$35.50	$15.50	Incl. with controller
PK-900 sans PACTOR	$80.50		
PK-900 with PACTOR	$35.50	$15.50	Incl. with controller
DSP-1232 sans PACTOR	$20.50		
DSP-1232 with PACTOR	$20.50	$20.50	Incl. with controller
DSP-2232 sans PACTOR	$20.50		
DSP-2232 with PACTOR	$20.50	$20.50	Incl. with controller

For additional information or to order your upgrade, call AEA today at (206) 775-1722.



Advanced Electronic Applications, Inc.
2006 196th Street S.W.
Lynnwood, WA 98036-7042
Office: (206) 774-5554
Fax: (206) 775-2340

0 to 9600

With Packet Transmission

Satisfy your need for speed with the new PK-96 9600 baud packet controller from AEA.

This high-performance machine comes standard with 1200 baud AFSK tone signaling, as well as 9600 baud K9NG and G3RUH compatible direct frequency modulation. The PK-96 makes an excellent terrestrial or satellite data controller. It can be used for high-speed data links to eliminate bottlenecks and increase system capacity.

Big capability in a small package is what you get from the PK-96. Under the hood, there is a 18K battery-backed MailDrop which is easily expandable to 100K. MailDrop allows you to automatically control third-party traffic and receive and reverse-forward messages.

Bring your system up to speed. Call AEA's Literature Request Line at (800) 432-8873 for more information, or call us direct at (206) 774-5554. Contact your favorite ham radio equipment dealer for the best pricing.

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Wide Dynamic Range and Low Distortion — The Key to Superior HF Data Communications

- Dynamic Range > 75 dB
- 400 to 4000 Hz
- BW Matched to Baud Rate
- BER < 1 X 10^{-5} for S / N = 0 dB
- 10 to 1200 Baud
- Linear Phase Filters

ST-8000 HF Modem

Real HF radio teleprinter signals exhibit heavy fading and distortion, requirements that cannot be measured by standard constant amplitude BER and distortion test procedures. In designing the ST-8000, HAL has gone the extra step beyond traditional test and design. Our noise floor is at -65 dBm, not at -30 dBm as on other units, an extra 35 dB gain margin to handle fading. Filters in the ST-8000 are all of linear-phase design to give minimum pulse distortion, not sharp-skirted filters with high phase distortion. All signal processing is done at the input tone frequency; heterodyning is NOT used. This avoids distortion due to frequency conversion or introduced by abnormally high or low filter Q's. Bandwidths of the input, Mark/Space channels, and post-detection filters are all computed and set for the baud rate you select, from 10 to 1200 baud. Other standard features of the ST-8000 include:

- 8 Programmable Memories
- Set frequencies in 1 Hz steps
- Adjustable Print Squelch
- Phase-continuous TX Tones
- Split or Transceive TX/RX
- CRT Tuning Indicator
- RS-232C, MIL-188C, or TTL Data
- 8, 600, or 10K Audio Input
- Signal Regeneration
- Variable Threshold Diversity
- RS-232 Remote Control I/O
- 100-130/200-250 VAC, 44-440 Hz
- AM or FM Signal Processing
- 32 steps of M/S filter BW
- Mark or Space-Only Detection
- Digital Multipath Correction
- FDX or HDX with Echo
- Spectra-Tune and X-Y Display
- Transmitter PTT Relay
- 8 or 600 Ohm Audio Output
- Code and Speed Conversion
- Signal Amplitude Squelch
- Receive Clock Recovery
- 3.5" High Rack Mounting

Write or call for complete ST-8000 specifications.

HAL Communications Corp.
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Urbana, IL 61801-0365
Tel (217) 367-7373 FAX (217) 367-1701