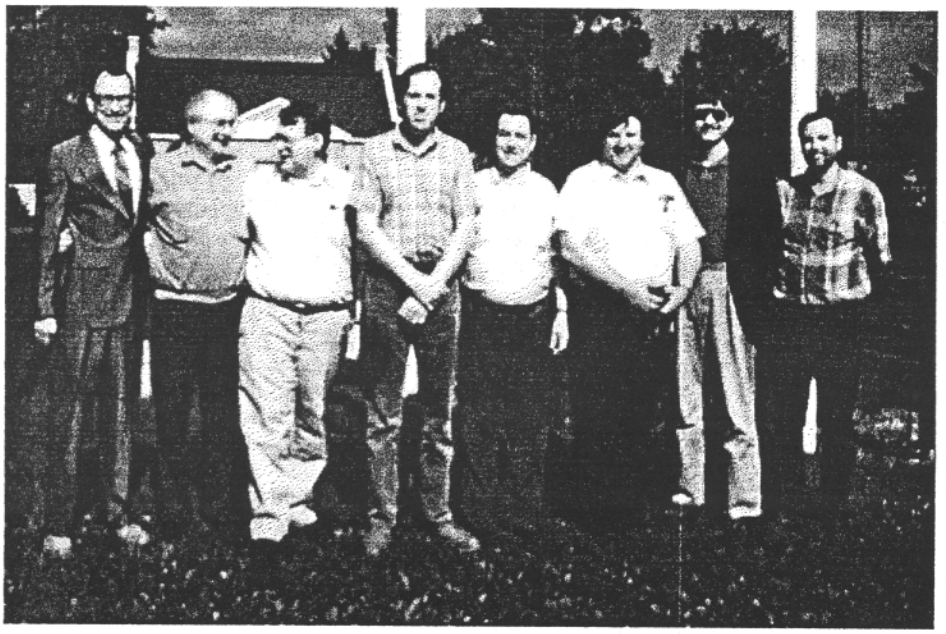
DIGITAL JOURNAL

Price: $2.95

A DEDICATED DIGITAL PUBLICATION Since 1953 VOLUME 40, NUMBER 6 JULY/AUGUST 1991

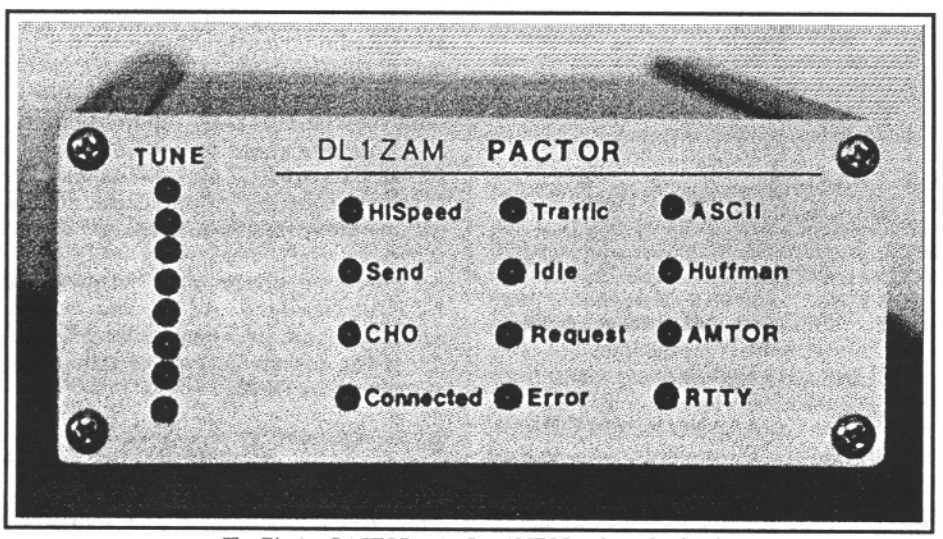
ARRL BACKS DIGITAL QUESTIONNAIRE

See report pg. 2



Digital Committee meeting at ARRL HQ in May 91. W1AW building is in background. From L. to R. - Frank Butler,Jr.,(Board Liaison), Dale Sinner, W6IWO, Tom Clark, W3IWI, Phil Karn, KA9Q, Paul Rinaldo, W3RI (Chairman), Doug Lockhart, VE7APU, Paul Newland, AD7I, Lyle Johnson, WB7GXD

IN THIS ISSUE



The Elusive PACTOR unit. See AMTOR column for details.

RTTY JOURNAL

Dale S. Sinner, W6IWO
Owner, Publisher, Editor

ALL CORRESPONDENCE:
9085 La Casita Avenue
Fountain Valley, CA 92708

Phone: (714) 847-5058
FAX: (714) 892-2720

SUBSCRIPTION RATES

USA/CANADA/MEXICO surf.$15.00
1st Class $18.00
FOREIGN ..... Surface $22.00/Air30.00

EXCEPTIONS: Estonia, Latvia, Lithuania, USSR, Asia, Australia, New Zealand, Pacific Islands, Africa (other than North Africa), Indian Ocean Islands and Middle East - AIR only: $30.00 (Surface mail not advised). Cash, check or money order, in U.S. funds only and with request - no credit cards accepted.

POSTMASTER:
The RTTY JOURNAL (USPS 391850) is published monthly, except combined May/June and July/August issues, for $15.00 per year, by RTTY JOURNAL, 9085 La Casita Avenue, Fountain Valley, CA 92708. Second Class postage paid at Santa Ana, CA 92799-9998 and additional mailing offices.

ADDRESS CHANGES:
Please send all address changes to: RTTY JOURNAL, 9085 La Casita Avenue, Fountain Valley, CA 92708.

ISSN 0033-7161

HITS & MISSES

Dale Sinner, W6IWO
9085 La Casita Ave.
Fountain Valley, CA 92708

ARRL Digital Committee Report

On May 25-26 of this year, I attended the Digital Committee meeting in Newington for the purpose of discussions on various topics affecting our phase of Ham radio and to help make recommendations to the Board for changes we might find beneficial. Keep in mind that the committee does not make decisions, only recommendations. Those in attendance are shown in the front cover picture except for Luck Hurter, KY1T, and Bill Henry, K9GWT. Tom Clark, W3IWI, Luck Hurter, KY1T, and Bill Henry, K9GWT were invited observers to the meeting. Tom spoke on the topic of "who is responsible for a Packet message," Luck gave a preview of a questionnaire he plans to distribute to all STA participants and Bill spoke on the new system of "Clover." The meeting was chaired by Paul Rinaldo, W3RI.

Other topics and their conclusions:

It was felt that a better approach should be attempted in explaining new technologies to all parties with whom the ARRL might meet with or deal, in advancing our hobby. The committee agreed it would be a good idea to prepare a briefing book for just such purposes. In addition, the group expressed the need for an updated "brag list" of technical accomplishments in Amateur Radio covering all phases, not just one particular mode.

Paul Newland, AD7I, reported on proposed modifications to Recommendation 625 and Report 1027 for submission to the Maritime working group. These modifications are primarily in language.

An 8 bit TOR like protocol was presented by Paul Newland, AD7I, that is quite different from previous methods. A request-for-comments type of article was suggested for QEX.

Bill Henry, K9GWT, gave the committee a complete overview of the "Clover" method of transmission. (See Jan, Feb, Mar, Apr issues of the RTTY Journal for more on Clover.) Considerable interest was shown in the Clover development and we will be hearing much more in the near future regarding its progress.

Tom Clark, W3IWI, gave a lengthy presentation of the 900 number message problem which occurred earlier this year. The subject of Amateur policing of such messages was discussed and concluded that Hams did indeed stop the transmission of the 900 number in question, long before the FCC had knowledge of its existence. After much discussion of who should be held responsible for message origination, the group unanimously agreed that the originator should be held responsible. Many of the ramifications of message handling were discussed, with the intent of finding some solutions on how to handle questionable traffic. At the present time, with what is available to the community, no conclusions could be drawn outside of cryptographic encoding of call signs to provide tamper-proof identification of the originating station.

Phil Karn, KA9Q, who is well versed in cryptography, gave the group a briefing on state-of-the-art cryptosystems. If deemed necessary, an effective authentication scheme could be developed but this would take quite some time to accomplish.

The committee discussed the desirability of petitioning the FCC to permit automatic operation on the HF bands. The encroachment of Packet operators below .100 on the bands and the total disaster on the 7MHz band are reasons enough for the need to make some changes. With the failure of RM-7248 to pass, the hobby is left without a program to replace it. However, there was the perception that everyones views were not considered in preparing the last proposal. At this point, all modes of digital operation were discussed for automatic operations, not just Packet. The committee decided, as a first step, a questionnaire be prepared for publication in QST, the RTTY Journal and other publications. A working group then prepared a first draft of the questionnaire for distribution to all committee members for further input.

To date the questionnaire has been distributed to all committee members for their input and hopefully we will see it in print shortly. When this questionnaire comes out, it behooves us all to take the time to respond. This will be your opportunity to speak out, don't let it pass without your input. We can and must solve our problems or they will be legislated for us.

That's all the space I have this month. Some of Columnists pictures have been omitted this month to provide for more column inches of content.

73 de **Dale, W6IWO** ■

AMTOR

Eddie Schneider, W6/G0AZT
1826 Van Ness
San Pablo, CA 94806

Hello Amtorites. After a short break, we columnists are back to the computer and spelling checker. Summer in the San Francisco Bay area where I live, started with a fairly good sized rain shower. Reminds me of G-1 and "summers!"

In the May/June issue I promised to publish some information on the "PACTOR" system and I am indebted to Herr Dr. Thomas Rink[1] and his group, for the following verbatim article.

PACTOR

Short system description

I. Introduction

AMTOR and PACKET RADIO (PR) have become rather popular ARQ techniques in Amateur Radio. Nevertheless, concerning poor-quality channels, their performance is far from optimum. AMTOR, matched to old mechanical teletype technology, represents the state-of-the-art some 20 years ago; PR was adopted from the X.25 protocol for data exchange on high-quality telegraph lines.

PACTOR (PT), specially designed for operation in noisy and fluctuating channels, is an improved half-duplex synchronous ARQ system combining the reliability of PR with the fixed AMTOR time frame.

Principal design considerations:

PACTOR comprises all important AMTOR or PR (2-way) characteristics:

- fixed timing structure and full synchronism to ensure maximum speed
- fast and reliable changeover/break-in
- required bandwidth less than 600 Hz
- 100% ASCII compatible (true binary data transmission)
- extremely low probability of undetected errors (16 bit CRC)
- independent of shift polarities
- no multi-user overhead in a narrow-band channel
- inexpensive hardware (Z80 single-board)
- high operational comfort (built-in message storage system, etc.)
- listen-mode (monitor)
- FEC-mode (CQ-transmissions etc.)

As a novelty in Amateur RTTY, some additional powerful features have been realized:
- optional coherent mode, i.e., system clocks locked to frequency standards (e.g., DCF77, TV deflection signals and other high precision broadcasts)
- online data compression (Huffman coding)
- automatic speed change (100/200 baud) without loss of synchronization
- fully acknowledged link termination (no QRT-timeout required)
- memory ARQ (even noisy packets can be restored)

II. Some system details

1. Timing

The basic PT transmission frame is very similar to AMTOR; blocks (packets) containing data information are acknowledged by short control signals (CS) sent out by the receiving station. Shift levels are toggled with every cycle in order to support memory ARQ (see below). Since the shift polarity is clearly defined at synchronization time, any conventions concerning 'mark/ space' become obsolete.

cycle duration: 1.25 sec
packets 0.96 sec = 192 (96) bits at 200 (100) baud
control signals : 0.12 sec = 12 bits, each 10 msec long
CS-receive gap : 0.29 sec

(Change of transmission speed only alters the internal packet structure; all other timing parameters remain constant.)

2. Packets

General packet structure:

/header/..20 (8) data bytes at 200 (100) baud../status/CRC/CRC/

Header: This byte enables fast synchronization and delivers auxiliary information. (memory ARQ, listen mode)

Data: arbitrary binary information

Status: system control byte (2 bit packet number, tx-mode, break-in, request, QRT)

CRC: 16 bit cyclic redundancy check based on CCITT polynomial X†16+†12+X†5+1, calculated over the entire packet (except header)

3. Control signals (CS)

Four CS are used. As a compromise between reliability and fast detection, a CS length of 12 bits was chosen.

CS1: 4D5, CS2: AB2, CS3: 34B, CS4: D2C (all hex numbers, LSB right)

The mutual Hamming distance is 8 bit, thus minimizing the chance of receiving a false CS. CS1/2 and CS3/4 form symmetrical pairs (bit reverse patterns).

CS1..3 have the same function as their AMTOR counterparts; CS4 serves as the speedchange control. In contrast to AMTOR, CS3 is transmitted as head portion of a special changeover packet (see below).

4. Starting a PACTOR contact

The calling station ('master') sends special synchronization packets:

/head (100bd)/..address (8 bytes, 100bd)../..address (6 bytes, 200bd)/

Normally, the receiver only used the 100-baud-section to achieve a fast synchronization. The 200-baud-section supplies additional information about the channel quality: if it is received correctly, the first CS will be CS4, otherwise CS1 is sent. After in turn having synchronized a CS4 or CS1, the master will continue with sending normal data packets at 200 or 100 baud, respectively. The first transmitted characters contain the 'system level number' (PACTOR software-version), followed by the master address (callsign).

5. Changing the TX direction

Similar to AMTOR, the receiving station (RX) can change the transmission direction whenever it has received a valid packet. For this purpose a special changeover-packet is transmitted, starting at the CS time frame. The transmitting station (TX) will switch to RX mode immediately after it has received the CS3 which forms the first section of the change-over-packet. It then reads in the rest of that packet and transmits a CS (CS1 and CS3=acknowledge, CS2=reject) timed at the last three bytes of the former packet frame. To force a break in, the TX sets the BK-status-bit (this corresponds to AMTOR '+?'.)

6. Speedchange

Speeddown only being useful in poor conditions or at low data input rates (e.g., manual typing), both directions are treated unsymmetrically.

a) Speeddown
The RX may request speeddown after any incorrectly received packet by sending CS4, which immediately forces the TX to build up 100-baud-packets (any unconfirmed 200 baud information is repeated at low speed).

b) Speedup
Any valid packet may be confirmed with CS4, forcing a TX speedup. In case the following high-speed-packet is not acknowledged after a number to tries, the TX will automatically perform a speeddown.

7. Termination of a PACTOR contact

Cutting an ARQ link inevitably leads to the problem that information has to be transmitted without final acknowledgment. PT applies special QRT packets, providing an expensive but rather effective solution. These packets contain an active QRT status bit and the RX address in byte- reverse order (low speed pattern.) If this address is found during the standby synchronization procedure, the RX responds with a single transmission of the final CS (The timing relations before stby are stored.) This method will always guarantee a well-defined QRT.

8. Data Compression

Character frequency analysis of typical English or German texts shows that the average amount of information per character does not exceed 4 bits. For that reason, ASCII text transmissions often carry a redundancy of 50%, which could be avoided by using a variable length code matched to the character distribution. The most popular example of such a code is the Morse code; PACTOR data compression mode applies Huffman coding with nearly optimum efficiency, yielding up to 100% speed gain. Every packet contains a compressed data string; character code lengths vary from 2 to 15 bits.

9. Memory ARQ

In conventional ARQ systems the TX has to repeat a packet until it has been received completely error free. It is evident that the probability of receiving a complete packet dramatically decreases with lower S/N ratio. The only way to maintain the contact in that case it to shorten packet length and/or to apply error correcting codes which in turn will greatly reduce maximum traffic speed when conditions are good. The method chosen by WAA Research Group is to sum up corresponding bit samples of subsequent packets and to test if the mean value (reduced to a O/1-decision) passes the CRC. To keep quantizing errors small, the samples are taken from the FSK-demodulator low-pass-filter output by means of an 8-bit AD-converter. Assuming white Gaussian noise, this accumulation method-also known as 'memory ARQ'-will obviously converge even at a low S/N ratio. Furthermore, since shift levels are toggled with every transmission, constant interfering signals within the receiver passband will not affect the resulting mean value. To prevent accumulation of old request packets, the header is inverted with every new information packet, thus serving as a RQ indicator (similarity test).

10. Listen Mode (Monitor)

This mode resembles Packet Radio monitoring: the receiver scans for valid packets which are detected by CRC match. This "brute force" method was chosen in order to ensure maximum flexibility, although it consumes a considerable amount of the available CPU capacity.

11. FEC Transmissions

CQ and bulletin transmissions are supported by means of a special non-protocol mode. Packets are transmitted with one or more repetitions; the CS receive gap is omitted. Since the listen mode does not require synchronization, the transmitting station possesses great freedom of selecting packet repetition rate and speed.

12. Practical Aspects

The first PACTOR programs were running on "breadboarded" Z80 single-board-computers. These early experiments led to the development of a stand-alone "PACTOR-Controller" (see picture page 5) with built- in modem and tuning-display. The conventional operating modes BAUDOT and AMTOR were added in order to maintain compatibility and what might be more interesting-to allow easy comparisons. Assuming typical conditions, PACTOR traffic can be expected to run 4 times faster than an AMTOR link.

Comments and Observations

Is PACTOR going to be the death of AMTOR as we know it? Doubtful in my opinion, however, there are some nice features in the PACTOR controller. The main one being that "conventional" modes like Baudot and AMTOR have been added, in order to maintain compatibility with non-PACTOR controllers. This means that a PACTOR equipped station can still communicate with the "older" AMTOR setup and if both stations have PACTOR capabilities, they can do some easy comparisons, AMTOR verses PACTOR, which should be interesting.

I do not have any evidence of trials conducted under H.F. conditions, so maybe Herr Doctor Thomas could send me a controller for Beta testing? I would be willing to purchase an IBM (clone) because I doubt if my trusty C-64 would be suitable, Hi.

PACTOR traffic claims to be four times faster than ARQ, assuming typical conditions. This feature is great for passing large amounts of pre-typed traffic like NTS messages or pulling files from a BBS etc. However, the average keyboard operator, including me, cannot type at high speed, so we may all have to take speed typing lessons or rely on the "speed change" feature.

Automatic logging is a great idea, I wish I had it! I hope that the Personal Mailbox System (PMS) does NOT have a beacon facility to "pollute" the already crowded H.F. bands.

The non-protocol PACTOR FEC mode should be a blessing. No longer will we have to worry about software that doesn't have sufficient synchronization (idles) to enable the receive station to copy AMTOR FEC. (My pet subject, remember?)

CW identification will help to find the over-driven, spectrum abuser, ARQ users who do not sign their calls very often!

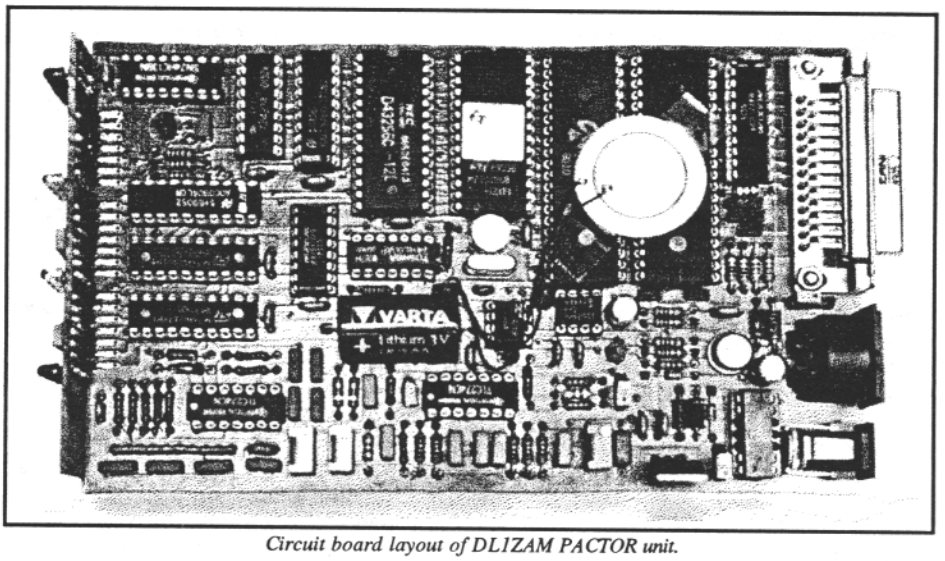
In conclusion, I would like to wish all those involved with the development of PACTOR, a happy future and hope that their system will be successful.

Laurel and Hardy?

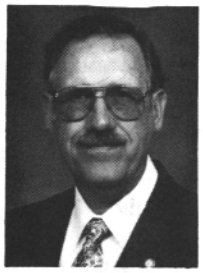
Look out RTTYers, Don, AA5AU and I, have teamed up again and we will be signing V2/GOAZT in the CQ WW RTTY JOURNAL contest. If we survive that ordeal, we will fly the 40 miles, nonstop, (that's what my airline ticket says), to Montserrat and sign VP2M/ from 30 Sept till 7 October, 1991. Please QSL V2 and VP2M/GOAZT, direct only, with sase or return postage, to BOX 5194 RICHMOND, CA 94805 US. Sorry, no bureau cards. QSLs for V2 and VP2M/AA5AU to callbook address. Small donations gratefully received, thanks.

73 GL and happy chirping.
de **Eddie, W6/GOAZT** ■

1. Units can be ordered from: Dr. Thomas Rink, Rontgentr, 36, 6450 Hanau 1, Germany. For further information, write to above address. Be sure to include SASE or $1 IRC.



Circuit board layout of DL1ZAM PACTOR unit.



MSOs

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

Hi Gang! Summer is here, the grass needs mowing, the garden needs weeding, and band conditions are some of the poorest I've seen in many years. According to some of the information I've just received however, Ol' Mother Earth has experienced the second largest solar flare in recorded history just recently, and it really has made a mess out of the bands. Even the AMTOR guys are complaining about many "link lost" timeouts, and usually if any mode will make it, AMTOR will. There were many days when the National Autostart Frequency, (14 085 625 Hz), was virtually dead for hours on end. And, in tuning across 20 Meters, very few RTTY/AMTOR signals were in evidence.

I had a very nice note from John Troost, TG9VT, Guatemala City, Guatemala, (and the DX Editor for the RTTY Journal), and I'm happy to report that he is doing better these days. Many of you may not have known that John underwent some very serious surgery a few months ago, and has been recuperating at home. His doctors have been keeping the Ol' Work Horse from spending too many hours at the office, (good for them!), and it has provided John with the opportunity to spend a few additional hours on the various digital modes. In addition to being an avid DX'er, John also maintains a very nice APLINK system, scanning several frequencies on different bands. For those of you who may be new to the RTTY or AMTOR modes, John provides a continuing service with his RTTY DX Bulletins, and they can be found in several of the MSOs on the National Autostart Frequency, as well as in several of the APLINK systems. John hopes to be able to attend the 1992 Dayton HamVention, and of course we'll be anxious to visit with him.

UNATTENDED PACKET RACKET

At the risk of being labeled an "alarmist," (some have used even more descriptive words, but Dale won't print them), I'm still concerned about the encroachment of unattended HF packet radio systems on 20 Meters. It would seem to me that the terms and specifications outlined for the FCC STA (Special Temporary Authority) concerning "unattended HF packet stations on 20 meters," are not only being routinely violated each and every day, but there seems to be some tacit approval of these violations. It's apparent even with routine monitoring of the packet systems at the high end of the digital area on 20 meters, that stations not specifically authorized by the STA are operating unattended systems, and that the frequency authorizations outlined in the STA are not being adhered to. And, in these days of enhanced enforcement, (whatever that means), by the FCC concerning the contents of unattended packet systems, why isn't the FCC requiring that those participating stick by the requirements of the STA?

Probably just as important however, is the amount of time that has elapsed since the original STA was approved. Does it take three years to prove or disprove the worth of unattended HF packet systems? I think not! What are the STA test objectives? Who rates the results of this testing, and where are the periodic reports of the testing program, etc? Are they being kept in some secret vault for only those who "need to know" are authorized to see? And who makes the decision to repeatedly ask the FCC for extensions to the STA for this project? Shouldn't there be some over-sight by disinterested parties to determine the overall worth of this project? I think it's time for the ARRL to own up to the fact that HF Packet has in fact been found to be ineffective, unreliable and in this day of nearly instantaneous VHF and landline communications, exceedingly slow. Is the ARRL unable to cut the cord with the participants in the STA and simply say "enough is enough?"

In the past few months, I've had numerous complaints about interference from HF Packet stations, particularly on 20 and 40 Meters. There isn't much I can do personally to influence the ARRL's position on this matter, but collectively, if each one of us makes it a matter of importance when we're visiting with our Section Managers, FCC Field Rep's, ARRL officials, etc., we can at least voice our feelings and hope that it filters down to those making the decisions. After the demonstrations of CLOVER II I witnessed at the Dayton HamVention this year, I think the ARRL has the saddle on the wrong horse! Comparing CLOVER II to HF Packet is like comparing a 1991 Ferrari to a 1988 Chevette!

MSO BACK SCATTER:

Al Kaiser, N1API, has returned his MSO to active duty again. Al's has been working a shift where he hasn't been able to monitor his MSO, and consequently has had to become inactive for a while. Al's good signal from the Northeastern United States covers very nicely and certainly is an asset to the NAS.

Larry Workman, KA0JRQ, not only maintains a well used MSO on the National Autostart Frequency, but has recently expanded into a scanning APLINK (AMTOR/PACKET LINK) system. Larry maintains a file in his RTTY MSO listing the frequencies that he is scanning.

For those of you not familiar with APLINK, it is quite a nice MBO (mailbox) system. The station transceiver scans a set of pre-determined frequencies, and

when the APLINK SELCAL code is decoded, automatically caused the MBO to become active, link to the remote station, and provide several services. Although this author feels that the major benefit of AMTOR is error correction, it also becomes one of the detracting features, in that data through-put speed does suffer markedly under less than optimum band conditions.

MSO Sysop Jay Roman, KB0ATQ, Rapid City, SD, tells me that he has had some response to a recent article about his "less than $200.00 MSO system." And, in the near future he will provide more specific information concerning the actual components, and some photos. Jay went to a lot of work to design and construct this IBM compatible computer MSO system, and it works well. Drop in on the National Autostart System and give it a try, (access code is MSOATQ).

MSO Sysop Frank Bascomb, K4KOZ, Boca Raton, FL, informs me that he has had to curtail some of his MSO activities on the National Autostart Frequency, due to some family medical problems. Frank, one of the original MSO stations dating back to the 1978 era, has provided excellent MSO service for a lot of years, and we hope that his family situation improves greatly in the near future so that he can re-join us on a full time basis.

Need information on how to run a MSO? Drop in on the National Autostart Frequency and drop a note to Brownie, K5FL, (access code MSO5FL). Brownie is fast becoming our "resident expert" on the various MSO systems out there floating around. He has the full HAL MPT3100 MSO system, utilizes the HAL PCI-3000 RTTY system in MSO service, has at least two versions of the W9CD MSO system up and running, and recently has been playing on AMTOR and APLINK. Who says that digital communications is a "young persons mode??" Brownie is 80 years young, and he's always been able to answer my questions about the various programs.

That's it gang! Have a nice Summer, and I'll see you on the MSOs. —73—

de **Dick, K0VKH** ■

THANKS FOR WRITING

A special thanks to all those subscribers who wrote to me regarding our digital band problems. Because of your input, I was able to carry with me to the Digital Committee meeting over 50 letters. They definately made it a lot easier for me to point out your feelings regarding enchroachment and unattended automatic operation in the digital segments of the bands. Thanks again. de **Dale, W6IWO**

DesqView and Ham Radio

Jim Mortensen, N2HOS
65 Holly Place Briarcliff Manor, NY 10510

Forty eight years ago as a brand new GI, I raised my hand when asked if I would like to get out of the Reception Center and then wound up in the paratroops. It was an experience that I would neither trade nor repeat. And now I wind up writing a column because I answered Jay's (WS7I) plea for "input from readers." Perhaps I will never learn. In any event, enjoy your time off Jay!

Prejudices must be bared before we get down to the subject of running a MS-DOS computer under DesqView, the assigned topic of this column. I vote against any machine that even thinks of using MS-DOS. I chose Macintosh for my consulting business and have been a serious user of that machine since the very first Mac came off the line. Even then, despite the blinding slowness, the interface invited you in, expected little of you, organized your efforts, hid nothing and delivered predictable results. None of that warm relationship disappeared as the size, speed and capacity of the II series put Mac at or near the head of the class.

Mac suffers but one shortage. No one writes decent RTTY/AMTOR software for the machine. Some think that it is Apples fault, others think it is but a question of the Mac's price. Regardless, the sole entry is Macratt, a program developed for Packet long before it was taken over by AEA and it is still just that. The new version II is due soon but my expectations are not too high. Thus trapped I limped into the enemies camp protesting all the way.

MS-DOS intimidates. It forbids you easy entry, it pursues you, schemes to become even more complicated as you begin to learn its secrets. Users, particularly large corporations spend untold millions trying to make the screen look like a Mac, burying the DOS to simplify its use for those millions of suffering operators. Never have so many spent so much and gained so little.

Enslaved at least for now, my approach has been to: a) use a DOS machine only when there is no choice; b) accept the inevitable but; c) scheme and plot to avoid entanglements with DOS to the extent possible.

Progress and pain were recorded in about equal amounts, and there were casualties - all software, fortunately. Most of the generally available programs underwent extensive trials in one or the other of my two stations. Most retired gracefully, one was trashed. In retrospect I think it was less the fault of the programs than it was of the environment they provided. They were incomplete. Sure they had dual screens; and yes some logged (after a fashion) but none gave me a "system" feel. None put me in charge of the entire process required for a good digital station today.

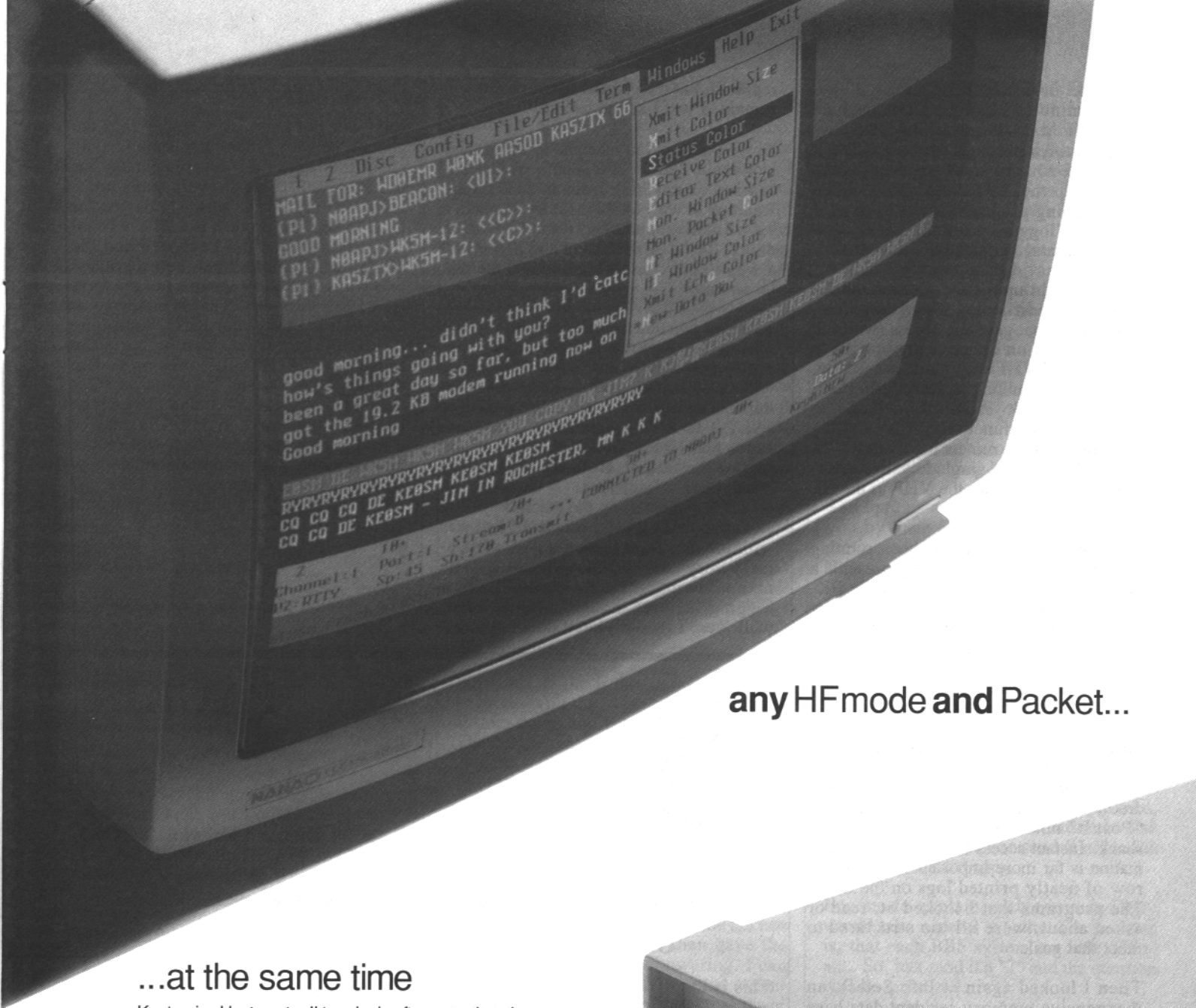
The optimum environment for RTTY contains at least three elements and each should be available on-screen continuously. Who doesn't need: a) the RTTY/AMTOR screen; b) the DX Packet Cluster screen; c) a logging screen? (If you don't use/don't have the DX Cluster I feel for you, not just because of the DX reporting but because of the mountains of data available at the stroke of a key.) You may want something entirely different but my guess is that you want or need more that one screen available to complete the task. For me the goal became clear. All I needed was a killer program.

WINDOWS! Of course. Of course not. Complications and requirements escalate dramatically under this questionable platform, and I abandoned it early in the game. Version 3.0 arrived as a gift with my new 386 machine and it was worth every penny of it. A klunker if I have ever seen one.

Dayton -1990 was the turning point. I saw and bought the HAL PCI-3000 board for my DOS machine (after Bill Henry assured me that NEVER would there be a Mac version). Coincidentally, John, TG9VT, brought up the subject of DesqView during a lunchtime conversation. He explained how he had set it up, how it goes about multi-tasking (in non-technical language) and how he used it down there on his mountaintop. I began to see a way to overcome my case of DOS-sydrome.

I plunged, and I was up to my eyeballs in challenges. Soon had the HAL board installed and running. The few glitches were frustrating but it turned out to be all that I had expected. Then came DesqView (from now on DV).

Continued top of page 8



any HF mode **and** Packet...

...at the same time

Kantronics Hostmaster II terminal software makes the multi-mode single keyboard system a reality. With a PC compatible computer, Kantronics All Mode (KAM ver. 4.0), your own HF\VHF transceivers and just a few keystrokes, you can work any mode on HF and packet on VHF at the same time.

Now with KAM version 4.0 firmware, you can operate CW, RTTY, FEC, ARQ, packet or copy NAVTEX on HF and packet on VHF/UHF simultaneously. Toggle back and forth between any HF mode and packet, view monitored and connected packets and HF data at the same time, or output text to your printer.

Additional features like scroll back for monitor/receive windows, built in text editor and multiple user programmable buffers which can be sent with a single keystroke enable you to easily run multi-channel and multi-mode whether you are a beginner or an expert.

The Host Master II /KAM all mode combination. The next step in the state of the art from Kantronics.

Kantronics 1202 E. 23rd St., Lawrence, KS 66046 913.842.7745 TELCO BBS 913.842.4678 FAX 913.842.2021

The ease of installation surprised me. Within minutes I had the DOS machine tamed. I told DOS (me telling DOS anything is a breakthrough!) to boot to DV it did. I wrote a macro and a single keystroke brought up the RTTY/AMTOR screen and a logging program. I was in charge! (Sadly the logging program quickly displayed its fatal faults, so out it went.)

I next brought up the DX Cluster and did so with little difficulty. There they were, two screens that gave me access (with full screen Zoom on either at my option) to both HF and VHF with no disconnecting, scrambling, fumbling or searing. In truth, it was a bit awkward until I delved into DV's LEARN function. This easy-to-write macro now moves me from RTTY to AMTOR with a single keystroke, another toggles me from the VHF to the HF screen.

This combination has now been running for several months and rarely presents a problem. It is far superior to the PK-232MBX arrangement that in theory keeps Radio 1 connected to Packet while you are on Radio 2 in RTTY.

Logging remains the missing link. I am not talking about contest logging, but daily logging where I need an open-ended, informal sort of QSO summary. Sometimes I enter nothing but the bare essentials. Other times I may need room for a hundred word note, the equivalent of those 20 "Post It" notes that get pasted about the shack. Instant access to that kind of information is far more important to me than a row of neatly printed logs on the shelf. The programs that I looked at, read or asked about, were all too structured to meet that goal.

Then I looked again at Info Select, an inexpensive memory resident data base program of sorts. I had purchased it for another use but never used it. After reading the manual again (what a jolly good idea that can be sometimes), I began to tinker with it. Without going into painful detail, I finally developed a stack (under the Forms utility) that seems to meet my need. Very simple to run (bring it up with ALT/J, then type F/L), the form arrives on the screen date and time stamped. The blanks are ready to fill in with any details you wish to add. The Notes section can be almost any length and the Search mode is fantastic, just type the first letter or two of the call you need and there it is. Impressive.

Info Select promises good results, but it is too early to celebrate. If is survives the shakedown, I will then have on the screen everything that is necessary. The programs can always be changed, added to or whatever, the macros can be altered or replaced, but the general environment will remain. I just like the feel of it.

Do you need a 386 machine to do all this? Not at all. Ted, W2FG, confirms that DV can run on anything from an 8086 on up. Running it with 640K memory can take a bit of management but it may be worth doing. Try it. Experiment and if you find a way to put contest logging into the mix let us know.

There are two other quick notes on my late Spring list. Packratt II arrived and looks pretty good. It is much like the earlier version in some respects. There are basic improvements in the ten macro messages (ALT-1 to ALT-0) and in the File Messages and Notes (five of the former and two of the latter). Both editing and use have been simplified. I worked the VOLTA contest using the macro keys and can state that the only problem I had was with the human at the keyboard, particularly very early Sunday morning. The manual is marginal as usual. The new logging feature, though untested, reads well (yes, I read it!) but it does not increment QSO numbers for contests. Sorry.

Last but not least, Bill Henry told me about a new toy (after complaining mildly about the lack of a software upgrades for the PCI-3000) that answers many problems. It may be the ultimate device for DOS haters. The product is a 20 key board that fits between the keyboard and the computer. Each key can be programed two ways (the $139 version) or 20 ways (the $289 version). That is either 40 or 400 macros - take your pick! Something like 8000 keystrokes can be buried in those keys. AUTOKEY uses no system memory, no system keys, no resident drivers, no RAM space and presents no conflict in memory. AUTOKEY may be a true idiot's delight since it will reduce anything you wish to do to a single keystroke. If you are interested call 1 800 767 6728. (Humm ... I wonder if it would work on the Mac?)

73 de **Jim, N2HOS** ■

(and Jay, please come back soon)

PACKET

Richard Polivka, N6NKO
7052 S Friends Ave Apt J
Whittier, CA 90602

GREETINGS

This is the start of the "Ham season" as I call it. Usually, hams are not that active during the summer months. I can attest to that situation, especially here in Southern California. The weather here has been hideously conducive to not spending time on the radio. I know, I have not been on that much. I would rather be outside enjoying the weather. Another problem is the job. I am constantly on call or on the road to one area or another. In order to remedy the boring drives that I have to put up with, I have put the HF radio into the company car. With the radio in the vehicle, I am now burning up 10 meters in the area of 28.350 MHz. Admittedly, the sun spots will be fading for about 11 years but I am out there going for it anyway. So, you may just hear me on the radio. The biggest problem running mobile is that other cars and power lines are not conducive to weak signal work. But that makes the hunt more challenging.

DSP

What the heck is this DSP that everyone is talking about? There are people out there who say that it is the cat's whiskers (where is the Galena chunk) when it comes to filtering signals and others just shrug their shoulders. DSP means Digital Signal Processing and it is done with the use of dedicated processor chips.

Let me explain how it works. But first, let me digress a bit. Usually, whenever you want to listen to a signal, you tune it in and use electronic or mechanical filters to select what and what not to listen to. This is usually done with capacitors, inductors, resistors, crystals, and amplifiers in some combination to effect the desired results. The signal processing is done electronically by processing voltages. The electronic equipment used will add NOISE (QRN) to the received signal. It is possible that a usable signal could be received by your radio but you can't hear it because the noise generated in the filter circuits masks the signal.

Now, when it comes to DSP, it is a different story. The process involved with DSP is completely different and yields results that can be far superior to an electronic filter. Let me explain the process. The received signal is brought to the input of the DSP unit. The input is changed into a sampled, digital form by a high speed Analog-to-Digital converter. The more bits that are used to represent the input signal and the more samples per second used, the better the processing can turn out. After the conversion to digital form is done, then it is routed to the Digital Signal Processor chip. This device is a dedicated processor that has imbedded in it programs that take the numbers generated from the input and massage them into different numbers for output. The programs used represent bandpass, high pass, low pass, and notch filters. Of course the particulars of the filters can be selected, such as Q, center frequency and filter gain. These are all manipulated through the software that is in the DSP chip. The massaged numbers that come out of the processor are then sent to a Digital-to-Analog chip to convert the numbers into the audio that we listen to.

The big advantages of DSP is that you can design any filter that you want and still keep accuracy without ADDING ANY SIGNIFICANT NOISE to the received system. The only noise that will get added is from the amps in the A-to-D and D-to-A converters. This noise will be quite a bit less than what you would have if you had used discrete parts. Probably the biggest drawback to using DSP is the $$$$ involved. These units are not cheap because DSP is in its infancy. The consumer market and the time that it takes to design a good DSP unit and the software involved has not yet evolved. As far as I know, there is no generic DSP unit out on the market that will work with everything. I know that Kenwood has a unit for their top of the line HF units. Also AEA has come out with a unit for Packet and there are several other manufacturers working on units for their product lines or for specific modes.

Here again, I have run into people that espouse the virtues of DSP to me and basically say that it is perfect for filtering and processing digital information from a radio. That statement is not completely correct. Nothing is perfect. I can't, and I know no one can, pull a signal out of the air, that is not there. So, if the signal is not there, you can't enhance it. However, DSP is a new tool for us to use in our quest for better throughput of signals. It is not a utopian solution to the filtering problem but, it is close. Stay tuned!

KEYBOARD ACCIDENT

I am an interesting bird. My desk is not one of those clean things that you would see in a Ham Station Beautiful contest. I do not have a teak tabletop with chestnut shelves. What I have is a 4' x 8' sheet of plywood (ACX) and a shelf built on the far side. It is not covered in any way except for the piles of who-knows-what and the latest projects that are stacked up left, right and sideways. Needless to say, my desk is a working one and it shows it. And since I spend many hours at the desk, either working the radios or just plain working (for real or play), I usually have something to drink next to me. When it gets hot, I drink like a fish and I feel that there are times that I can out swig one too. This particular round, it was a glass of iced coffee, and a rather full one to boot. I had turned around to see what the commotion was here in the house and I then turned back. Wellllllll, the back of my hand found the glass and the iced coffee found a great catch basin, my keyboard. Needless to say, it was a rush to shut things down before smoke began pouring from my equipment.

Well, all of the lights came on, on the keyboard and that was that. So, I shut the system down and unpluged the keyboard. The coffee that was inside was disposed of in the wastebasket while yours truly was thinking unprintable thoughts. I figured that I should just leave the keyboard in the basket and get a new one. I then decided that I had nothing to lose in trying fix it. I separated the keyboard and took the plastic case to the shower and washed the covers down. After that task was complete, I turned on the oven in the kitchen to about 150 degrees. I then gave the circuit board the ritual showering. I can now hear the screams of the purist technicians out there that you NEVER use water on a circuit board. Doubting Thomases, read on. After rinsing the board off, it was deposited into the oven to bake out the water. After about two hours and allowing the board to cool down, the keyboard was put back together. I then plugged in the keyboard and tried it. Eureka, it worked just fine the first time.

I do not recommend this procedure for all to try because if some of the water gets into the switches, you will have nightmarish problems. However, I use water all of the time at work to clean off circuit boards when either lacquer thinner or alcohol won't do the job. I just make sure that the board is dry before applying power, sometimes as high as 600 VDC. In this case, it worked for me and I had everything to gain and nothing to lose except a few bucks.

BBS COMMANDS

I have received several letters from people concerning the commands found on BBSs and how to use them. First we have several BBS programs out there written by such people as W0RLI, WA7MBL, and WA8BXN to name a few. They all pretty much have the same command structure with a sufficient enough variance to avoid finger pointing and the crybaby routines indicating they were copied.

Whenever you log onto a BBS for the first time, there will usually be a set of questions asked of you. The answers are used to add you to routing tables and the like. After the preliminaries are taken care of, comes the part that some people equate to two Rhines butting heads; the options.

The options are usually just presented to you by their first letter only or by some distinctive letter in the command name. This is where you can really get goofed up and run into the Centipede's Dilemma. But there is an answer to your questions. Just about all of the systems respond to the command "?". The plain ol' forgotten question mark sent at the command prompt will direct the BBS to spill a brief listing of what each command is and how to use it. It is also possible for you to type the question mark separated by a space and the command letter that you need information on. This is where I wholehearted suggest having the file capture on, so you can store the information to disk for future reference or send it off to the printer for a hard copy.

For me to explain each command here would take several months. The problem is, that each BBS system is a little different. So, just send it a "?" and the question will be answered.

WHO KNOWS WHAT THE FUTURE HOLDS

Here is the battle plan for this season. Next month, we will continue with the PBBS commands and start to cover that funky interface between your computer and your TNC called politely RS-232. I know, I have called it some unsavory names at times. After that, we will cover how to talk to your TNC, whether it be by computer or dumb terminal. Once we get talking to the box, then it is on to how to talk and listen to the radio. When that is complete, we shall discuss doing connects, using digipeaters (ugh!), and nodes. Then we can get real fancy after the basics are covered.

Until next month, keep the deviation down and your signals clean.

de **Richard, N6NKO** ■

CONTESTING

Hal Blegen, WA7EGA
2021 E. Smythe Rd.
Spangle, WA 99031

CQWWRTTY

The CQWW-RTTY contest continues to grow. The 1987 kickoff wound up 300 logs submitted. For this year's effort, the biggest success so far, there were 437 logs from 80 countries! As a rule of thumb, for every log received there are at least two guys out there who work a little DX and give their friends a few points but don't send in their logs. It doesn't look like RTTY contesting is in danger of failing for lack of participation.

This year there were two new classes: MULTI-MULTI with W3LPL nosing out VE7ZZZ and SINGLE-ASSISTED with a really close finish between W2UP and WA7EGA.

Considering the QSO point advantage for DX, the possibility that two of the four main categories in this year's CQWW would be won by USA stations seems unlikely. Lets see what happened.

CLASS OF THE TITANS

W3LPL had to overcome 2:1 QSO point advantage against VE7ZZZ and 3:1 against JL1ZCG. Just organizing enough operators to take on the challenge of MULTI-MULTI deserves high praise and without meaning to detract in any way from the effort at all three QTHs, I have to say that the smart money was on W3LPL from the beginning. The east coast multiplier advantage is a pretty well established fact. Although the boys from BC had a better QSO rate, the 200K difference in score represents a valiant but doomed effort when compared to LPL's ability to work Europe on 5 bands and connect to the world's largest PACKET spotting system. It was no surprise when LPL came up with enough (over 100 more countries and zones) to win. Furthermore, in MULTI-MULTI, the scoring advantage for stations outside North America is overshadowed by a general paucity of equipment. RTTY contests add a whole layer of computers to the already staggering array of rigs and antennas required to effectively compete on five bands at once. A properly equipped MULTI-MULTI like W3LPL may have more electronics in operation during the CQWW than some DX countries use to run their governments!

ONE STAYED HOME, ONE FLEW SOUTH

WA7EGA stayed home. In the SINGLE-ASSISTED category, the east vs. west multiplier advantage was again obvious but this time the tech-weeny award went to WA7EGA. By running two bands at once, he logged 234 QSOs more than the competition. This offset W2UP's 40 country, 14 zone multiplier advantage and allowed EGA to squeak by with 2% margin. EGA ran four TUs, a PACKET TNC, two transceivers, a set of 6-pole, custom-made RF bandpass filters, four computers and SCOTCHLOG (which scores two bands at once). Nobody in their right mind works that hard for an RTTY contest!

I'm convinced that the lack of entries in this class was probably just an oversight. The ideal way to operate this class is to catch the coat tails of a MULTI that is putting out packet spots and ride with the tide. Given that most of the world SINGLE-OPs have neither PACKET Clusters for DX spotting nor enough PACKET-equipped, RTTY operators around their QTHs, to be worth the bother, the real reason that I was surprised to see this category dominated by the USA was probably just a case of not paying attention. While it would be cheating for a station that used PACKET spotting to enter as a regular, single op, with a clear conscience, any of the world, top-five singles could have walked away with a plaque simply by adding the word "ASSISTED" to their log entry. Yup, good thing that Jay suggested that I run assisted. I suspect it will be a busy category, this year.

WS7I flew south. With the expressed desire to set a peak-of-the- cycle, SINGLE-OPERATOR ALL BAND record, Jay made what looked like an easy choice. He went to HC5K's in Ecuador. We were in the Galapagos for multi-single in 1987 and discovered that the propagation from zone 10 is excellent. Forty through ten meters is open everywhere regardless of the flux and K indices and it's a north/south path to everywhere and in 1989 when we went back, we were happily reminded that it was also out of the hurricane track. You can almost work the states with a hand-held for 3 points. Ted's (HC5K) QTH at Quenca, runs a pair of Christmas trees for the high bands, a 2 element yagi for 40 meters, and a wire on 80. The QTH overlooks the city from 9000 feet and the weather is beautiful, year around. Yup, a no-brainer decision for Jay, HC5J.

The hard part of packing your bags for a contest is figuring out how to leave Murphy at home when you board the plane. The cardinal rule of the contest is TEST EVERYTHING. The second cardinal rule is TEST IT AGAIN. In Ecuador, far from the source code and the only guy who could repair it, the first time Jay fired up the logging software, all the send functions that interfaced to a PK232 bombed. The only fix was to add a whole layer of computer equipment, a 2nd keyboard and another TU. Jay said that be spent so much time trying to get the bug out of my software that he forgot to check out the 40 and 80 meter bands before the contest. In the heat of battle, much too late to re-work the ground system, he discovered that running more than 50 watts on either of the two low bands ate the computer. The display was blank on the ICOM 751 and the previously arranged for backup radio was out of town. On modern equipment, there isn't much you can do that doesn't require a functional display. To find a frequency, he guessed at the band, tuned around til he heard RTTY, held down the key and read the frequency on a counter (ready, fire, aim.) By reducing power to 20 watts, he was able to work a VE and a US station on 40 and 80 meters. Late Sunday, Ted and Diego (HC8VB) worked him on a borrowed rig from a spare bedroom for HC5K and ZONE 10 on five bands. (For the count, those 9 contacts totaled 16 multipliers!) Congratulations to HC5J for a world record in a tough category.

THE RIGHT STUFF

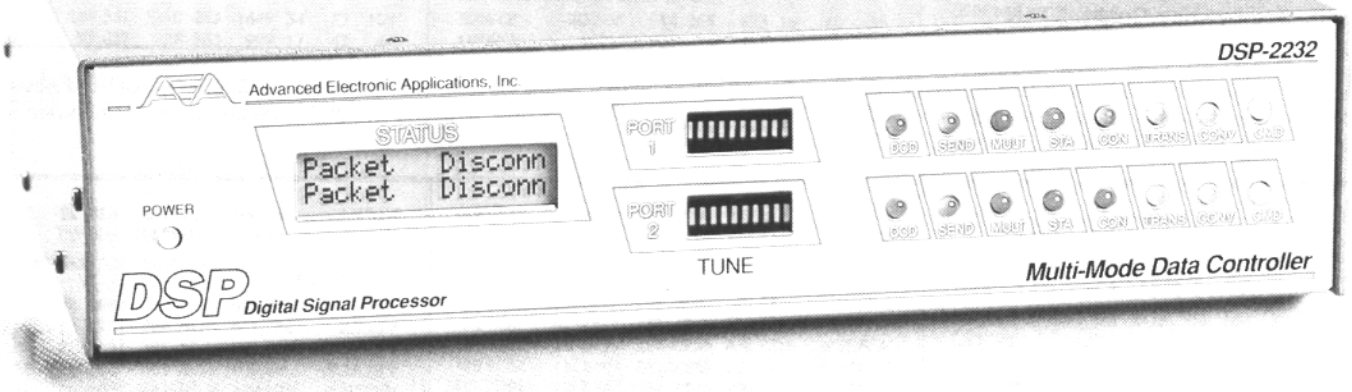
The folks from UZ9CWA did an excellent job of putting rare, RH7E on the air for the MULTI-SINGLE win. This is the traditional way the CQWW used to work. It is certainly no easy feat to pack the contest gear for RTTY and set up at a new QTH. This is a hard working crew which has shown tremendous improvement over the past few years and THE CQWWRTTY MULTI-SINGLE is just one of several world, first places for them this year. Congratulations to all.

PICK YOUR CLASS AND SHARPEN YOUR TEETH

As D-DAY for the CQWW approaches, the most difficult task isn't just getting the gear in shape or deciding whether band conditions will support 10 meters. Sometimes the real question is how to pick a class that avoids competing in the same class against somebody you can't beat. The rule changes this year made that choice more difficult. You can't run all band and then use the shot-gun technique to try to win a single-band category by entering extra logs. For those who may want to operate single band, I'll publish the all time records next issue along with some skinny on the ARRL ROUNDUP. Until then, see you on the bands.

de **Hal, WA7EGA** ■

AEA is...



Packet...plus!

If you want the best Packet or multi-mode equipment available, look no further. These data controllers have no equal when it comes to features, performance and value.

The versatile DSP-2232 (above) is simply the most powerful multi-mode controller available to amateurs. It features Digital Signal Processing modems, dual simultaneous ports, all known amateur digital modes, Packet and AMTOR mailboxes, and much more.

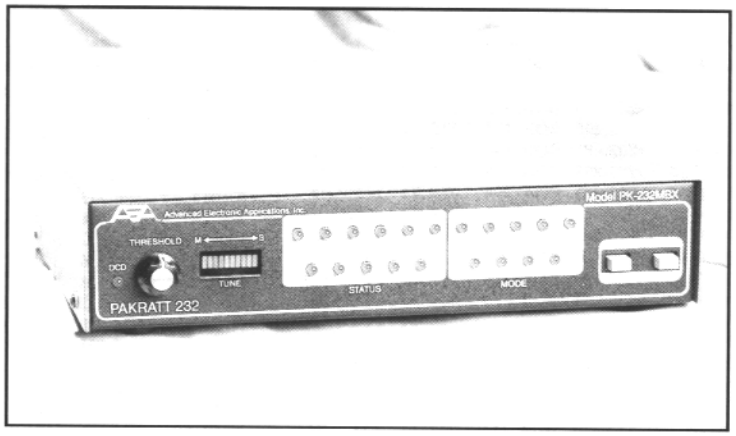
The legendary PK-232MBX (top right) has long been the most popular data controller ever, and is still going strong. Includes: Chebyshev filter design, Host Mode, Signal Identification mode and more. With features like these, no wonder it's number 1.

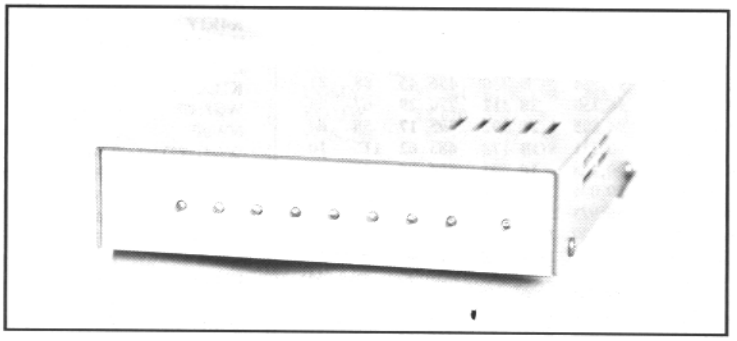
For Packet only, the PK-88 (center) and its PC-compatible plug-in counterpart, the PCB-88 (bottom right) offer AEA's famous Host Mode, Packet maildrop, KISS mode, lithium battery-backed RAM...the list goes on and on.

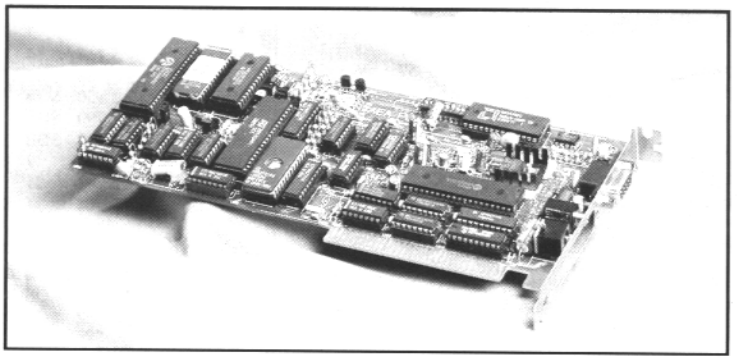
When hams think of Packet, they think of AEA.

AEA *is* Packet...plus!

For complete information on these or any other AEA products, call the toll-free Info-Line at (800)432-8873.







Advanced Electronic Applications, Inc.

P.O. Box C2160/2006 196th St. S.W. Lynnwood, WA 98036
Technical Support (206)775-7373 FAX (206)775-2340
Upgrade Line (206)774-1722
CompuServe I.D. 76702,1013

RESULTS

1990 CQ/RTTY JOURNAL WW RTTY DX CONTEST

prepared by: Roy Gould, KT1N

Legend: Number groups after call letters denotes following: Classifications (SOB= Single Operator All Band, SOA= Single Op All Band Assisted, MOS= Multi-op Single Transmitter, MOM= Multi-Op Multi-transmitter), Final Score, Number of QSOs, Points, Zones, Countries, and State/Canadian Province. Winners are shown in Boldface type.

SINGLE OPERATOR

AMERICAS

UNITED STATES

Call	Score	CL	QSO	PTS	Z	C	W/VE
WA7EGA	**669,693**	**SOA**	**932**	**1767**	**70**	**151**	**158**
W2VP	**656,496**	**SOA**	**697**	**1692**	**84**	**191**	**113**
W3FV	**552,636**	**SOB**	**535**	**1428**	**88**	**196**	**103**
K0LUZ/4	**525,960**	**SOB**	**639**	**1461**	**78**	**165**	**117**
AB4ES	471,466	SOB	608	1306	78	163	120
WF1B	**446,400**	**SOB**	**565**	**1240**	**76**	**164**	**120**
NJ0M	**390.504**	**SOB**	**545**	**1228**	**74**	**150**	**94**
N6GG	**390,069**	**SOB**	**431**	**1071**	**79**	**148**	**112**
K6WZ	316,510	SOB	478	1021	70	142	98
W4HBK	314,847	SOB	433	1053	72	151	76
AA5AU	**306,516**	**SOB**	**444**	**861**	**80**	**147**	**129**
N2FF	**293,037**	**SOB**	**419**	**1007**	**70**	**154**	**67**
AA4M/6	**269,015**	**SOA**	**449**	**865**	**74**	**132**	**105**
NO2T	264,264	SOB	463	924	66	135	85
WF5T	241,860	SOB	402	834	69	124	97
NC7K	**218,295**	**SOB**	**394**	**735**	**71**	**110**	**116**
W9KDX	**202,681**	**SOB**	**344**	**841**	**63**	**121**	**57**
NT3B	**183,855**	**SOB**	**359**	**721**	**72**	**101**	**82**
N3UN	**182,382**	**SOA**	**294**	**678**	**71**	**125**	**73**
NT0V	180,936	SOB	398	718	59	91	102
W8RXJ/0	176,288	SOB	305	787	64	128	32
WB2EAR	143,004	SOB	336	701	45	87	72
KD2YG	140,880	SOB	259	587	60	118	62
WI1Y	138,276	SOB	299	668	47	93	67
W4TOY	132,930	SOB	276	630	51	108	52
N0FMR	128,180	SOB	283	580	51	96	74
N1FTD	127,022	SOB	265	602	52	106	53
WB8YJF	**119,626**	**SOB**	**224**	**559**	**62**	**115**	**37**
WF5E	**117,561**	**14**	**402**	**789**	**30**	**67**	**52**
N4LIH	117,116	SOB	237	437	41	133	94
K1DG	116,813	SOB	233	587	47	114	38
W6JOX	110,149	SOB	223	481	62	90	77
KK4DK	98,091	SOB	26	519	49	87	53
KA9PJZ	97,850	SOB	191	515	59	112	19
KA4RRU	97,584	SOB	230	456	45	88	81
AB8K	**96,250**	**28**	**312**	**770**	**29**	**67**	**29**
KA5YSY	**94,605**	**21**	**392**	**795**	**17**	**58**	**44**
K5KLA	**90,321**	**SOB**	**172**	**483**	**62**	**115**	**10**
KC2FD	**90,220**	**14**	**344**	**694**	**26**	**59**	**45**
WB6ZHN	89,024	SOB	204	428	57	84	67
WA6UFY	88,973	SOB	230	461	47	67	79
WD4KXB	86,520	SOB	180	420	57	98	51
KI4MI	83,104	SOB	199	424	47	90	59
W2KHQ	82,161	SOB	185	459	46	89	44
K1CGJ/M	79,608	SOB	190	428	49	84	53
W8PBX	77,568	SOB	198	404	46	75	71
W2JGR	77,355	SOB	193	405	50	88	53
KE0KB	**71,628**	**28**	**248**	**564**	**31**	**71**	**25**
KN6J	**71,424**	**28**	**276**	**576**	**27**	**58**	**39**
WA6SDM	71,040	S0B	191	384	51	98	36
K7PB	65,625	SOB	143	375	57	96	22
WA8FLF	64,260	SOB	170	357	49	75	56
NE1I	61,178	SOB	140	362	52	90	27
N4ROL	58,316	SOB	158	344	44	81	44
K6WZ	56,680	28	208	520	27	61	21
WZ6Z	54,165	SOB	134	345	52	57	48
W8LNK	54,020	SOB	152	365	41	78	29
NQ6C	**53,790**	**21**	**261**	**489**	**24**	**45**	**41**
WJ7S	**52,308**	**14**	**215**	**441**	**27**	**50**	**41**
WA4MCZ	50,530	SOB	129	326	46	85	24
W9RXJ/0	**48,272**	**21**	**177**	**431**	**29**	**61**	**22**
W4KQS	47,740	SOB	145	341	34	72	34
KE4BM	46,576	SOB	147	284	43	63	37
W8AKS/6	44,548	SOB	130	301	48	63	37
W3AOH	44,023	SOB	119	331	45	76	12
N2FF	**42,728**	**21**	**183**	**436**	**20**	**53**	**25**
KY7M	40,752	SOB	137	283	44	57	43
N7GVV	39,930	S0B	141	330	32	60	29
W2FCR	35,964	21	135	333	26	58	24
W9KE	35,816	SOB	122	296	31	64	26
KD4MM	33,516	SOB	113	266	41	56	29
W3HXI	**33,088**	**21**	**158**	**352**	**22**	**49**	**2**
WA1IML	32,520	SOB	129	271	32	49	39
KB3DF	**31,080**	**14**	**142**	**296**	**21**	**49**	**35**
N8AGU	30,371	SOB	108	251	41	54	26
W9KDX	**28,440**	**28**	**138**	**360**	**22**	**46**	**11**
AA5BT	28,248	SOB	104	214	39	52	41
NC7K	**27,324**	**28**	**146**	**297**	**23**	**38**	**31**
AA6QY	25,990	S0B	102	226	38	44	33
KA3JFI	**25,596**	**28**	**131**	**316**	**25**	**40**	**16**
NT0V	24,600	28	128	300	24	43	15
KC8FS	24,240	SOB	104	202	30	49	41
N1FTD	24,030	21	120	267	20	40	30
NN5T	23,560	SOB	94	190	36	46	42
KA8WAS	**22,707**	**14**	**142**	**261**	**18**	**40**	**29**
AA5AU	**22,707**	**28**	**112**	**261**	**21**	**46**	**20**
K0BJ	22,578	SOB	80	213	38	57	11
WI1Y	21,840	21	125	273	20	35	25
WB2VTD	20,982	14	113	269	18	43	17
K0VW	20,832	SOB	102	186	31	38	43
K2RYI	20,273	SOB	84	209	27	53	17
W0LHS	19,656	SOB	102	189	23	36	45
KE0Y	19,012	SOB	75	196	37	50	10
W4DEC	17,836	SOB	79	182	33	41	24
N0HYG	17,628	SOB	101	156	29	33	51
KF6HI	17,172	28	112	212	19	32	30
NF2K	16,910	SOB	68	190	32	52	5
WC4E	15,925	SOB	100	175	22	34	35
WF5T	15,910	28	94	215	21	36	17
WD7I	13,333	28	104	199	16	26	25
KM4IG	13,000	SOB	79	125	27	29	48
N9CCI	**12,696**	**21**	**94**	**184**	**21**	**33**	**15**
N0FMR	**12,070**	**14**	**88**	**170**	**14**	**29**	**28**
K4KIY	**11,457**	**21**	**87**	**171**	**17**	**26**	**24**
KA4RRU	**11,151**	**28**	**70**	**177**	**15**	**33**	**15**
KS4S	11,092	28	76	188	18	32	9
K1CGJ/M	**10,773**	**28**	**66**	**171**	**17**	**35**	**11**
WG8H	10,191	SOB	59	129	24	34	21
NW0F	9,954	SOB	66	126	24	32	23
WA4DYD	9,348	SOB	56	114	27	30	25
HK3GZB/W4	**9,333**	**14**	**108**	**183**	**10**	**30**	**11**
W6IWO	8,673	21	83	147	16	20	23
KD3KW	8,437	28	59	143	17	32	10
KC4GR	**7,544**	**SOA**	**47**	**92**	**29**	**28**	**25**
NT3B	**7,303**	**7**	**88**	**109**	**28**	**10**	**29**
KI4MI	6,370	28	46	130	13	33	3
WW8Q	**6,006**	**28**	**67**	**143**	**12**	**21**	**9**
WI2T	5,886	14	55	109	12	21	21
N8KHS	5,642	SOB	51	91	17	17	28
KE4BM	5,593	28	49	119	13	26	8
KD3KW	4,704	7	61	96	8	14	27
KR1Z	**3,444**	**14**	**34**	**84**	**12**	**20**	**9**
WA8TXT	**3,108**	**3.5**	**73**	**84**	**3**	**3**	**31**
KE7KU	2,950	SOB	34	59	15	16	19
WB4ETY	**2,790**	**SOB**	**24**	**62**	**19**	**23**	**3**
N3DCH	2,730	SOB	31	65	14	19	9
KD2YG	**2,698**	**7**	**50**	**71**	**6**	**7**	**25**
NW0F	2,242	21	34	59	12	14	12
N8KHS	**1,488**	**21**	**29**	**48**	**8**	**7**	**16**

ALASKA

NL7RA	**359,805**	**SOB**	**609**	**1411**	**59**	**87**	**109**
AL7BB	219,730	SOB	430	1022	53	74	88
KL7PG	68,452	SOB	259	628	27	42	40
NL7RA	**62,800**	**21**	**265**	**628**	**22**	**39**	**39**
KL7PG	54,600	21	249	600	20	33	38

CANADA

XM7CQD	**390,000**	**SOB**	**668**	**1500**	**50**	**95**	**115**
VE6ZX	**356,160**	**SOB**	**548**	**1272**	**51**	**104**	**125**
VE3XO	**133,938**	**21**	**396**	**1063**	**24**	**66**	**36**
VE1AUE	**88,407**	**SOB**	**256**	**627**	**29**	**55**	**57**
VE2JR	**84,836**	**SOB**	**188**	**508**	**42**	**91**	**34**
VE6KRR	82,099	SOB	260	551	34	38	77
VE3OCX	**73,986**	**SOB**	**159**	**418**	**54**	**93**	**30**
VE4AIY	**62,464**	**SOB**	**232**	**488**	**29**	**39**	**60**
VE3FJB	52,164	SOB	163	414	43	83	0
VE1AUE	**47,138**	**21**	**208**	**518**	**18**	**39**	**34**
VE2OWL	45,540	SOB	139	330	34	54	50
VE3JAN	**38,024**	**14**	**157**	**388**	**19**	**41**	**38**
VE7IRA	27,170	SOB	107	247	33	34	43
VE6CNN	**18,675**	**28**	**102**	**249**	**18**	**33**	**24**
VE6UX	**2,460**	**3.5**	**46**	**82**	**3**	**2**	**25**
VE2FFE	**1,682**	**14**	**24**	**58**	**8**	**12**	**9**
VE6SH	**1,161**	**21**	**21**	**43**	**6**	**11**	**10**
VO1AW	**1.075**	**SOB**	**18**	**43**	**8**	**9**	**8**

CAYMAN ISLANDS

ZF1RY	**209,625**	**14**	**673**	**1625**	**21**	**59**	**49**

COSTA RICA

TI2YO	**122,200**	**21**	**397**	**940**	**26**	**65**	**39**

GUATEMALA

TG9VT	**1,142,946**	**SOB**	**1090**	**2702**	**91**	**182**	**150**

ST. PIERRE ET MAQUELON

FP5DX	**985,704**	**SOB**	**1030**	**2452**	**80**	**164**	**158**

OCEANIA

AUSTRALIA

VK2BQQ	**73,948**	**SOB**	**190**	**556**	**43**	**90**	**0**
VK3EBP	**62,964**	**14**	**198**	**583**	**24**	**48**	**36**
VK2BQS	6,174	14	53	147	12	14	16
VK8BE	**1,197**	**21**	**21**	**63**	**8**	**8**	**3**

GUAM

KG6DX	**591,839**	**SOB**	**633**	**1867**	**80**	**134**	**103**

AFRICA

EA8AKQ	**188,300**	**SOB**	**314**	**1076**	**32**	**60**	**83**
EA8RA	**160,820**	**SOB**	**313**	**935**	**34**	**69**	**69**
EA8AKQ	**45,825**	**14**	**48**	**84**	**8**	**12**	**16**

CEUTA & MELILLA

EA9JV	**171,360**	**21**	**412**	**1224**	**17**	**69**	**44**

DJIBOUTI

J28TY	**94,868**	**SOB**	**214**	**641**	**29**	**35**	**84**

GABON

TR8JLD	**644,333**	**SOB**	**774**	**2293**	**57**	**117**	**107**

IVORY COAST

TU2UI	**104,272**	**SOB**	**230**	**686**	**ER**	**67**	**51**

KENIA

5Z4BI	**39116**	**SOB**	**174**	**508**	**25**	**52**	**0**

MALI

TZ6VV	**145,962**	**SOB**	**309**	**918**	**38**	**63**	**58**

SIERRA LEONE

9L1US	**288,351**	**SOB**	**483**	**1449**	**34**	**57**	**108**
9L1US	**93,627**	**28**	**303**	**909**	**17**	**42**	**44**

SOUTH AFRICA

ZS6BCR	**31,440**	**21**	**133**	**292**	**22**	**30**	**18**

ASIA

ASIATIC RUSSIA

UW9CY	**335,225**	**SOB**	**461**	**1265**	**61**	**140**	**64**
UAOKC1	106,950	SOB	260	690	42	87	26
UA9YAD	8,985	SOB	53	147	22	33	0

CHINA

BZ4SAA	**52,569**	**SOB**	**226**	**531**	**36**	**63**	**0**

EAST MALAYSIA

9M6HF	**63,729**	**SOB**	**223**	**657**	**33**	**36**	**28**

GEORGIA

RFIF/UA3TT	**19,533**	**28**	**139**	**383**	**13**	**27**	**11**

INDIA

VU2SJV	**114,264**	**SOB**	**200**	**552**	**54**	**116**	**37**
VU2NBT	**66,300**	**28**	**276**	**789**	**21**	**45**	**19**
VU2SJV	28,106	28	108	299	19	54	21

JAPAN

JR1LJV	**123,066**	**28**	**328**	**954**	**28**	**59**	**42**
JA2WYQ	**56,914**	**SOB**	**150**	**398**	**47**	**62**	**34**
JA3EOP	**42,240**	**21**	**152**	**440**	**24**	**45**	**27**
JA2NNF	**33,027**	**14**	**118**	**327**	**27**	**49**	**25**
JE2UFF	28,593	14	128	353	23	38	20
JA4RED	23,280	SOB	80	240	33	52	12
JH8JBX	9,246	14	50	138	25	34	8
J11CQA	7,524	SOB	46	132	20	25	12
JA11HS	7,242	28	48	142	14	20	17
JA7KM	5,452	28	41	116	16	27	4
JA6WW	4,464	14	33	93	18	24	6
JAODWY	3,984	SOB	35	83	19	26	3
JA3BCT	3,773	SOB	33	77	22	27	0
JA7NJN/1	3,700	28	35	100	11	18	8
JH8QBY	2,475	14	28	75	11	19	3
JR2CFD	**1,829**	**7**	**25**	**59**	**12**	**19**	**0**
JA8EAT	1,560	7	24	60	8	8	10
J16JSD	672	21	14	32	9	11	1

KOREA

HL9RY	**531,973**	**SOB**	**686**	**2963**	**63**	**109**	**99**
HL1SX	87,786	SOB	168	467	60	95	33

OGASAWARA

JH1QDB/JD1	**544,101**	**SOB**	**683**	**1857**	**68**	**127**	**98**
JH1QDB/JD1	**94,657**	**28**	**321**	**919**	**20**	**43**	**40**

TAIWAN

BVRVB	**135,408**	**SOB**	**281**	**728**	**56**	**96**	**34**
BVRVB	**18,963**	**21**	**121**	**301**	**20**	**32**	**11**
BV4VB	**16,055**	**14**	**90**	**247**	**16**	**31**	**18**
BV4VB	**8,350**	**28**	**65**	**167**	**17**	**28**	**5**
BV4VB	**104**	**7**	**5**	**13**	**3**	**5**	**0**

TURKEY

TA3B	**160,072**	**SOB**	**306**	**856**	**52**	**101**	**34**
TA3D	108,429	SOB	258	769	30	65	46

WEST MALAYSIA

9M2AX	**27.030**	**SOB**	**134**	**318**	**33**	**42**	**10**

EUROPE

AUSTRIA

OE3XCW	**30,371**	**SOB**	**92**	**251**	**41**	**50**	**30**

BALAERIC ISLANDS

EA6ZP	**63,935**	**14**	**265**	**673**	**16**	**40**	**39**
ON6NL	9,735	28	55	165	17	17	25

BELGIUM

ON6NL	**28**	**9,735**	**55**	**165**	**17**	**17**	**51**
ON4APU	**777**	**14**	**13**	**37**	**7**	**7**	**7**

BULGARIA

LZ5Z	**242,400**	**14**	**567**	**1515**	**32**	**77**	**51**
LZ11A	**24,304**	**SOB**	**88**	**217**	**36**	**58**	**18**
LZ2KRU	**5,200**	**21**	**55**	**130**	**12**	**24**	**4**
LZ2XA	**2,958**	**3.5**	**49**	**102**	**6**	**20**	**3**

CZECHOSLOVAKIA

OM2BXW	**61,776**	**14**	**226**	**572**	**20**	**49**	**39**
OK1FGC	**22,464**	**SOB**	**102**	**208**	**34**	**61**	**13**
OK1DJO	**11,484**	**21**	**76**	**198**	**19**	**25**	**14**
OM7TCL	8,046	21	55	149	15	22	17

DENMARK

OZ1FGS	**202,884**	**SOB**	**339**	**957**	**51**	**77**	**84**
OZ1BBN	62,155	SOB	161	401	39	73	43
OZ6EI	**2,701**	**14**	**38**	**73**	**12**	**18**	**7**

ENGLAND

G0ARF	**352,500**	**SOB**	**462**	**1250**	**66**	**121**	**95**
G4SKA	**28,314**	**14**	**141**	**363**	**19**	**36**	**23**
G4SKA	**27,966**	**28**	**127**	**354**	**19**	**35**	**25**

ESTONIA

ES7FU	**20,286**	**21**	**132**	**322**	**16**	**30**	**17**
ES7JW	**8,904**	**28**	**86**	**212**	**13**	**23**	**6**

EUROPEAN RUSSIA

UA1OJ	**148,074**	**SOB**	**353**	**851**	**39**	**94**	**41**
RA3DX	61,242	SOB	128	354	56	89	28
UW1YY	**45,036**	**21**	**200**	**417**	**23**	**51**	**34**
UW3AT	7,626	SOB	61	123	20	40	2
UA3XBB	**4,171**	**14**	**57**	**97**	**13**	**30**	**0**

WEST GERMANY

DJ6JC	**421,960**	**SOB**	**496**	**1370**	**73**	**119**	**116**
DF2UQ	108,580	SOB	231	610	48	80	50
DL4FJ	76,650	SOB	168	438	49	81	45
DF5BX	41,454	SOB	115	294	46	69	26
DJ2YE	28,677	SOB	99	237	38	61	22
DK7FP/P	14,678	SOB	64	179	23	29	30
DF5BX	**4,606**	**21**	**37**	**98**	**16**	**21**	**10**

FARDE ISLANDS

OY9JD	**111,625**	**28**	**341**	**893**	**26**	**57**	**42**

FINLAND

OH2LU	**371,270**	**SOB**	**509**	**1370**	**56**	**113**	**102**
OH2BUQ	58,646	SOB	163	413	39	68	35
OH9SV	52,000	SOB	163	416	31	59	35
OH1TD	36,600	SOB	123	305	44	49	27
OH1NSJ	15,200	SOB	77	190	25	42	13
OH5MN/2	2.040	SOB	23	51	16	21	3

FRANCE

TQ6JD	**1,157,308**	**SOB**	**1030**	**2809**	**79**	**181**	**152**
F1LVW	516,432	SOB	554	1537	78	135	123
F8XT	63,640	SOB	138	370	59	78	35
F6BFH	61,787	SOB	188	451	58	79	0
F6FGY	20,979	21	98	259	20	41	20

EAST GERMANY

Y24MN/A	**190,149**	**SOB**	**286**	**789**	**66**	**104**	**71**
Y41ML	103,113	SOB	236	603	51	72	48
Y23VB	**23,120**	**21**	**108**	**289**	**18**	**32**	**30**
Y23YE	**1,275**	**7**	**24**	**51**	**7**	**18**	**0**

HUNGARY

HA6PX	**634,068**	**SOB**	**700**	**1957**	**67**	**137**	**120**
HA5CP	174,947	SOB	290	754	71	123	62
HA6VV	174,947	SOB	270	697	70	133	48
HA5HO	**34,977**	**14**	**222**	**393**	**22**	**49**	**18**
HA5CP	**20,400**	**28**	**89**	**255**	**23**	**29**	**28**

ITALY

I2SVA	**481,584**	**SOB**	**558**	**1524**	**73**	**135**	**108**
I3MIQ	219,085	SOB	375	1019	57	94	64
IK8ERL	132,088	SOB	233	632	54	91	64
IK0CNA	116,560	SOB	273	752	33	117	5
IO0KHP	94,689	SOB	204	567	39	59	69
I4XQG	31,590	SOB	94	270	35	50	32
IK0CNA	**25,140**	**28**	**147**	**419**	**10**	**47**	**3**
I2HWI	21,070	SOB	81	215	33	39	26
IK2IKW	20,882	SOB	78	197	37	53	16
I2WEG	8,923	SOB	41	113	24	28	19
I2FUM	**2,304**	**7**	**32**	**72**	**7**	**22**	**3**
IK1NDB	2,130	7	32	71	7	19	4

LICHTENSTEIN

HBO/HB9NI	**271,558**	**SOB**	**414**	**1141**	**57**	**99**	**82**

LUXEMBOURG

LX1OM	**274,314**	**SOB**	**399**	**1047**	**59**	**122**	**81**
LX1OM	**29,565**	**28**	**132**	**365**	**20**	**31**	**30**

NETHERLANDS

PA3DBS	**298,116**	**SOB**	**428**	**1183**	**57**	**98**	**97**
PA3ESZ	45,402	SOB	125	329	41	64	33
PA3DBS	**44,100**	**21**	**174**	**490**	**18**	**32**	**40**
PA0YN	**4,922**	**28**	**40**	**107**	**14**	**19**	**13**

NORTHERN IRELAND

GI4TSK	**26,051**	**SOB**	**97**	**239**	**32**	**43**	**34**

NORWAY

LA7AJ	**11,748**	**SOB**	**60**	**178**	**23**	**20**	**23**
LA9RFA	**11,275**	**21**	**81**	**205**	**18**	**28**	**9**

POLAND

SP9BCH	**85,359**	**14**	**307**	**769**	**22**	**56**	**33**
SP2UUU	**74,218**	**21**	**236**	**656**	**23**	**47**	**43**
SP3AUV	**35,340**	**SOB**	**122**	**310**	**38**	**50**	**26**
SP3BGD	27,824	21	107	296	25	42	27
SP2XR	25,200	14	147	336	20	44	11
SP7FQI	17,680	SOB	90	208	28	46	11
SP6AOI/A	**16,524**	**28**	**87**	**243**	**19**	**28**	**21**
SP5JTR	13,992	14	84	212	16	32	18
SP6CYV	12,740	14	82	196	14	37	14
SP9MAX	9,864	SOB	54	137	27	28	17
SP3MYS	2,190	14	30	73	9	19	2
SP2ZCD	620	21	11	31	8	7	5
SP3RBT	**551**	**7**	**14**	**29**	**5**	**12**	**2**
SP9KVZ	216	14	9	18	4	7	1
SP3IBM	36	28	3	6	2	3	0

PORTUGAL

CT1CKP	**42,824**	**SOB**	**153**	**372**	**39**	**72**	**31**

ROMANIA

YO6JN	**81,344**	**SOB**	**198**	**496**	**46**	**92**	**26**
YO3JW	**13,020**	**21**	**91**	**210**	**17**	**36**	**9**
YO6CFB	8,232	21	54	147	18	22	16

SCOTLAND

GM3UTQ	**98,525**	**SOB**	**237**	**563**	**44**	**100**	**31**

SICILY

IT9OCP	**54,240**	**SOB**	**133**	**339**	**54**	**77**	**29**

SPAIN

EA7TV	**169,435**	**SOB**	**281**	**721**	**64**	**115**	**56**
EA3GCV	**56,500**	**28**	**179**	**500**	**25**	**49**	**39**
EA1AW	47,875	SOB	145	383	28	57	40
EA1DCQ	**37,674**	**14**	**177**	**414**	**17**	**39**	**35**
EA3GCT	**32,085**	**21**	**137**	**345**	**23**	**47**	**23**
EA4BAS	30,411	SOB	108	279	26	44	39
EA7TV	26,076	14	113	318	21	36	25
EA3GDH	15,111	28	84	219	19	29	21
EA3GCJ	11,700	14	97	225	11	26	15
EA7MA	6,820	SOB	41	110	22	23	17
EA3DWX	4,230	SOB	33	90	12	13	22

SVALBARD

JW9MAA	**22,989**	**SOB**	**120**	**291**	**16**	**38**	**25**

SWEDEN

SM5FUG	**549,150**	**SOB**	**583**	**1569**	**77**	**154**	**119**
SM0DJZ	**153,012**	**SOA**	**243**	**622**	**70**	**129**	**47**
SM7AIA	147,126	SOB	301	791	66	54	66
SM6ASD	**141,778**	**21**	**381**	**1066**	**28**	**58**	**47**
SM4CMG	52,170	SOB	137	370	41	63	37
SM7BGE	32,596	SOB	114	281	31	58	27
WM3DXC	15,499	SOB	71	154	33	48	19
SM4CMG	**11,232**	**28**	**50**	**135**	**26**	**29**	**12**
SM4CJY	9,045	SOB	50	135	26	29	12
SM5CCT	888	SOB	16	37	8	11	5
SM5PPS/5	**24**	**14**	**2**	**6**	**2**	**2**	**0**

SWITZERLAND

HB9DCQ	**189,758**	**21**	**442**	**1201**	**31**	**79**	**48**
HB9CFY	**41,072**	**SOB**	**123**	**302**	**44**	**70**	**22**

UKRAINE

RB0HZ	**91,280**	**SOB**	**224**	**560**	**38**	**85**	**40**
UB5KN	**28,244**	**28**	**124**	**307**	**24**	**47**	**21**
UB4HQ	**9,990**	**7**	**101**	**222**	**10**	**35**	**0**

UNITED NATIONS GENEVA

4U1ITU	**236,842**	**29**	**547**	**1499**	**32**	**79**	**47**

WALES

GW3NYY	**35,389**	**SOB**	**125**	**305**	**31**	**59**	**26**

YUGOSLAVIA

YT2GW	**219,240**	**14**	**570**	**1512**	**30**	**67**	**48**

HAWAII

AH6JF	**169,505**	**SOB**	**343**	**1015**	**43**	**57**	**67**
AH6IX	9,204	SOB	53	156	18	22	19
WN6I	7,050	SOB	50	150	13	7	27

INDONESIA

YC1YMN	**116,051**	**21**	**344**	**1027**	**25**	**50**	**38**

NEW ZEALAND

ZL2AKI	**237,244**	**SOB**	**356**	**1036**	**63**	**93**	**73**

PHILIPPINES

KE9A/DU3	**268,882**	**SOB**	**400**	**1154**	**70**	**111**	**52**
KB0FUE/DU3	**52,332**	**21**	**210**	**588**	**24**	**47**	**18**
DU1CSU	5,382	SOB	49	138	16	20	3
DU1CSU	1,700	21	30	85	7	11	2

WESTERN SAMOA

5W1KT	**246,528**	**SOB**	**435**	**1284**	**46**	**72**	**74**

SOUTH AMERICA

ARGENTINA

LU9DBK	**278,411**	**SOB**	**435**	**1283**	**51**	**78**	**88**

BRAZIL

PP5JD	**204,953**	**28**	**492**	**1541**	**26**	**60**	**47**
ZX4V	78,309	28	267	791	18	39	42

CHILE

CE6EZ	**201,312**	**21**	**469**	**1398**	**28**	**66**	**50**
CE3BFZ	**76,725**	**SOB**	**169**	**495**	**36**	**67**	**52**

COLOMBIA

HK4EGW	**40,128**	**14**	**142**	**418**	**12**	**30**	**54**
HK4LLH	**31,920**	**21**	**156**	**456**	**19**	**30**	**21**
HK3DDD	8,190	14	45	126	24	35	6

ECUADOR

HC5J	**1,364,972**	**SOB**	**1143**	**3362**	**89**	**185**	**132**
HC5J	**207,411**	**28**	**495**	**1471**	**27**	**69**	**45**
HC5J	**124,968**	**14**	**345**	**1016**	**28**	**55**	**40**
HC5J	**101,882**	**21**	**288**	**842**	**27**	**55**	**39**

PERU

OA4ZV	**439,967**	**SOB**	**582**	**1739**	**56**	**82**	**115**

TRINIDAD

9Y4BU	**82,720**	**SOB**	**176**	**517**	**38**	**66**	**56**

MULTI-OPERATORS

NORTH AMERICA

UNITED STATES

Call	Score	CL	QSO	PTS	Z	C	W/VE
W3LPL	**1,728,520**	**MOM**	**1377**	**3160**	**102**	**260**	**185**
KY1F	**318,108**	**MOS**	**535**	**1082**	**62**	**121**	**111**
W1GZ	256,564	MOS	405	833	67	138	103
W4AQL	**184,576**	**MOS**	**339**	**721**	**59**	**113**	**84**
N6IIIQ	**115,092**	**MOS**	**305**	**556**	**48**	**74**	**85**
W3/VK1GN	86,436	MOS	199	441	41	84	71
K7SS	**18,054**	**MOS**	**87**	**177**	**37**	**42**	**23**

CANADA

VE7ZZZ	**1,522,824**	**MOM**	**1524**	**3558**	**91**	**162**	**175**
VE3UR	**98,496**	**MOS**	**222**	**576**	**46**	**82**	**43**

ASIA

ASIATIC RUSSIA

4K0ADS	**802,060**	**MOS**	**857**	**2380**	**78**	**171**	**88**
UZ9CZM	317,811	MOS	402	1131	65	157	59
UZ9LWE	77,633	MOS	170	469	44	97	16

CHINA

BY4AA	**315,360**	**MOS**	**537**	**1460**	**59**	**106**	**51**
BY3WNG	202,662	MOS	534	1251	60	102	0

JAPAN

JJ3YBB	**876,942**	**MOS**	**779**	**2242**	**80**	**162**	**109**
JA7YAA	594,877	MOS	733	2117	67	129	85
JL1ZCQ	**315,806**	**MOM**	**409**	**1174**	**69**	**115**	**85**

TURKOMAN

RH7E	**1,778,448**	**MOS**	**1321**	**3792**	**103**	**238**	**128**

EUROPE

CZECHOSLOVAKIA

OK1KQJ	**362,292**	**MOS**	**494**	**1362**	**64**	**111**	**91**
OK1KSL	186,702	MOS	317	841	59	95	68

ENGLAND

GX0CNC/A	**205,856**	**MOS**	**366**	**919**	**46**	**93**	**85**

EUROPEAN RUSSIA

UZ3AYR	**891,405**	**MOS**	**864**	**2201**	**86**	**209**	**110**
UZ3PWJ	8,750	MOS	62	125	19	37	14

FRANCE

FF1COM	**782,275**	**MOS**	**879**	**2407**	**68**	**137**	**120**
FF6KRJ	**40,872**	**MOS**	**114**	**312**	**39**	**47**	**45**

ITALY

IK1MSL	**748,668**	**MOS**	**750**	**2103**	**76**	**157**	**123**
IY4AJ	44,776	MOS	143	386	26	45	45

KALININGRADSK

UZ3DWH	**241,119**	**MOS**	**434**	**1101**	**50**	**102**	**67**

LATVIA

UQ0A	**619,801**	**MOS**	**667**	**1807**	**78**	**147**	**118**

POLAND

SP3PLD	**55,867**	**MOS**	**138**	**347**	**50**	**83**	**28**
SP4KEV	13,962	MOS	80	179	21	46	11

SWEDEN

SK5WB	**14,973**	**MOS**	**73**	**161**	**27**	**40**	**26**

SWITZERLAND

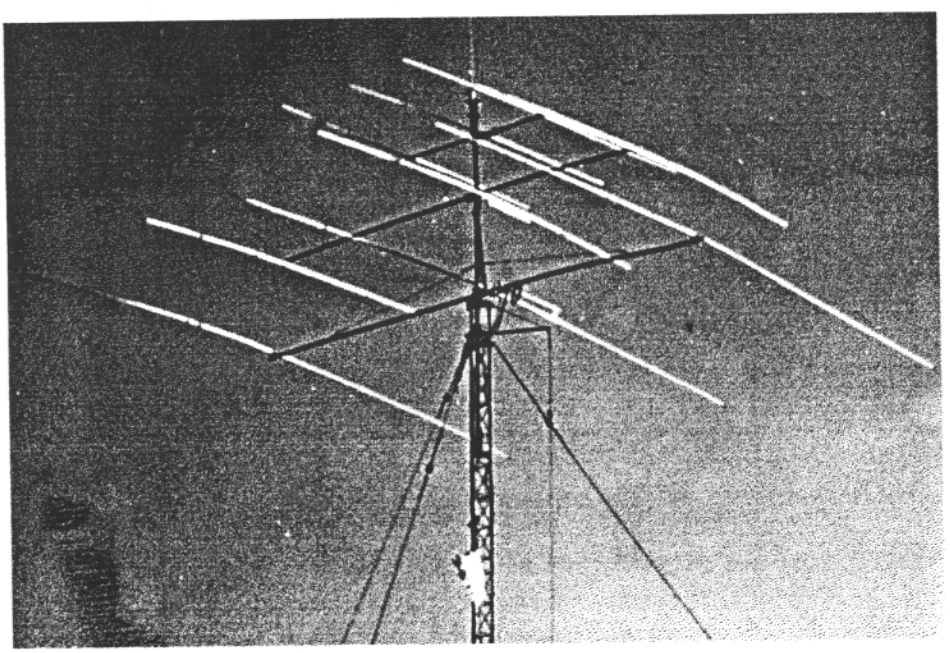
HB9DCW	534,400	MOS	615	1670	69	127	124

WEST GERMANY

DL0GK	**940,443**	**MOS**	**853**	**2357**	**88**	**172**	**139**
DJ2BW	**782,592**	**MOS**	**726**	**2038**	**85**	**176**	**123**

YUGOSLAVIA

YU4EZC	**188,881**	**MOS**	**314**	**847**	**53**	**94**	**76**



Antennas at NC7E, Tim's station, 218,295 points in SOB Class

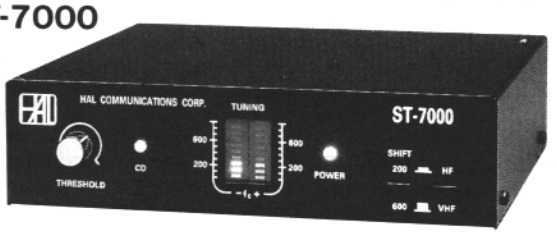
HENRY RADIO IS THE PLACE
. . .THE BEST PLACE
to fill all your data communications needs

The TEMPO MPP1

. . .a unique new mobile data printer, includes a packet controller and a 13.6 VDC printer that interfaces with any mobile radio. in a recent user test it proved to have about twice as much audio level range tolerance as other TNCs. It is also an ideal unit for emergency work and a commercial version is perfect for dispatching service, emergency and police vehicles.

HAL Communications' ST-7000

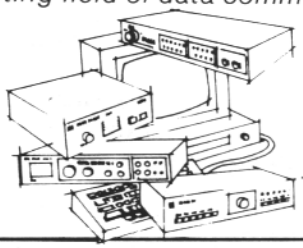
HF-Packet Modem. . .a high performance modem designed specifically for 300 baud HF-Packet. It offers no-compromise performance to assure optimum operation under the most demanding signal conditions. Techniques developed for government and military use are used in the ST-7000. AGC-controlled AM signal processing provides a wide dynamic range. All filters and detectors are optimized for 300 baud HF-Packet. It offers the 200 Hz shift mode and a wider 600 Hz shift mode, each supported by separate 6-pole input filters and a 40 db AGC system.



The PK-232 by AEA

. . .the only controller offering Morse Code, Baudot, ASCII, AMTOR, Packet, and facsimile Transmission & Reception plus the ability to monitor the new Navtex marine weather and navigational system. . .7 modes in one controller. The PK-232 makes any RS-232 compatible computer or terminal the complete amateur digital operating position. All decoding, signal processing and protocol software is on ROM. Only a simple terminal program (like those used with telephone modems) is required to interface the PK-232 with your computer. **Watch for the new and exciting AEA FSTV-430. Have fun on amateur TV!**

Obviously, we can fill in a system that you have already started. Or we can furnish a complete system to fit your needs and budget. For example, here's some suggestions for the amateur just entering the exciting field of data communications, or: for the amateur who wants the best available.



NO. 1 For the fun (and very affordable) mode, VHF Packet, AEA PK-88 with personal mailbox, 8K programmable memory and TCP-1P compatability.
For serious 20 M world-wide DXing on Packet, 200 or 600 Hz shift. . .add the superb HAL ST-7000.

NO. 2. . .top of the line! The HAL ST-8000 or HAL ST-6000 and AEA's PK-232 . . .the winning combination. You can't do better for all-mode, all-band enjoyment of hi-speed data communications.

If you have any questions concerning these units, or would like to discuss your requirements with a knowledgeable specialist, please call or ask for Fred Daukantas, N6SFD. We also carry a large selection of excellent commercial products for data communications and emergency systems as well as a complete inventory of amateur equipment and linear power amplifiers.

HENRY RADIO 61 YEARS OF SERVICE **Henry Radio**

2050 S. BUNDY DR. ● LOS ANGELES, CA 90025 ● (213) 820-1234
Toll free order number: (800) 877-7979 TELEX: 67-3625(Henradio) FAX (213) 826-7790

The 1991 CQ World - Wide RTTY DX Contest

Starts 0000 UTC Saturday - Ends 2400 UTC Sunday September 28-29, 1991

I. Announcing: The Fifth Annual CQWW RTTY DX Contest, Co-sponsored by CQ magazine and the RTTY Journal.

II. Objective: For amateurs around the world to contact other amateurs in as many CQ Zones and countries as possible using the digital modes.

III. Contest Period: 0000 UTC September 28 to 2400 UTC September 29, 1991. The total contest period is 48 hours, but no more than 30 hours of operation are permitted for single operator stations. The 18 hours of OFF time can be taken any time during the contest period, but OFF periods may NOT be less than three (3) hours in length. All ON and OFF periods MUST be clearly noted in the log and summary sheets.

(a) Multi-Operator and Multi-Multi stations may operate the entire 48 hour period.

(b) A Single Operator MAY operate more than the 30 hours, but only the FIRST 30 hours will count toward their Official Score. (This allows rarer DX to give their multiplier to more stations.)

OPERATOR CLASSES!!!

- **1. Single Operator, 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.**
- **2. Single Operator 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 may change bands at any time.**
- **3. Multi-Operator, Single Transmitter. All band entry only. More than one person operates, logs, checks for duplicates, use of a spotting net, etc. Only one (1) transmitter and one (1) band permitted during the same time 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 (10) minute rule will be automatically reclassified as multi-multi to reflect their actual status.

- **4. Multi-Operator, Multi-Transmitter. All band entry only. No limit to the number of transmitters, but only one (1) signal per band permitted. a. 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.**

V. Entry Categories: Single Operator entries may enter either; (A) All Band. (B) Single Band.

Single Operator Assisted and Multi Operator entries can only enter all band only.

VI. Modes: Contacts may be made using Baudot, ASCII, AMTOR (FEC & ARQ) Packet. (No unattended operation or contacts through Gateways or Digipeaters).

VII. Bands: 80, 40, 20, 15 and 10 meters. Don't forget that VE stations cannot operate below 7.100 and that the Novices/Techs cannot operate below 28.100.

VIII. 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 as well.

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

X. Countries: The ARRL and WAE Country lists will be used. NOTE: THE U.S.A. AND CANADA COUNT AS COUNTRY MULTIPLIERS. EXAMPLE: The 1st US State and Canadian area you work not only count as a multiplier for the state or area, but also count as a country multiplier for each band.

XI. 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.

XII. Multiplier Points: One (1) multiplier point for each U.S. 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: KL7 and KH6 are country multiplier ONLY and NOT state multipliers. One (1) multiplier point for each CQ zone worked on each band. A maximum of 40 per band.

NOTE: Canadian areas are VO1, VO2, VE1 N.B., VE1 N.S., VE1 P.E.I., VE2, VE3, VE4, VE5, VE6, VE7, VE8 N.W.T AND VY YUKON.

XIII. Final Score: Total QSO points times the total multipliers equals the total claimed score.

XIV. Contest Entries and Logging Instructions: CQWW RTTY DX logs and forms should be used to facilitate scoring and checking. All Logs Must:

1. Show times in UTC.

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

3. Indicate State/VE area, Zone and Country Multiplier only the FIRST TIME it is worked on EACH BAND.

4. Use a separate log sheet for EACH BAND.

5. A check list of duplicate contacts for EACH BAND (DUPE SHEET)

6. A MULTIPLIER Check Sheet for each band.

7. An overall SUMMARY SHEET showing total QSOs, Points, Zones, Countries and states/VE areas worked.

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

Contest forms are available from CQ, the RTTY Journal and the Contest Director. RTTY Journal address is 9085 La Casita Avenue, Fountain Valley, CA 92708. Please include a large SASE with 2 units of US first class postage or IRCs.

XV. 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 disqualifi-

cation. 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.

XVI. 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.

XVII. Deadline: All entries must be postmarked NO LATER than December 1, 1991. An extension may be given if requested. Logs should be mailed to: Roy Gould, KT1N, CQWW RTTY DX Contest Director, P.O. Box DX, Stow, MA 01775, U.S.A.

FP5DX, CQ/RTTY WW Contest. St. Pierre et Maquelon

JH1QDB/JD1, CQ/RTTY WW Contest, operated from Ogasawara.

Ed Sutton, WA8FLF, works HC5J, on 10, 15, and 20 meters.

Plaque Donors

Single Operator, All Band

World - AEA, Advanced Electronic Applications ,Inc.
North America - HAL Communications Corp.
South America - Association of DX-EX, Ecuador
Europe - HAL Communications Corp.
Oceania - The RTTY Journal
Asia - N5JJ Memorial
Africa - Roy, KT1N & Roland, N1FTD

Single Operator, Single Band

Single Band high score - Kunihiko Fujii, JH1QDB
21 MHZ- Dennis, WD4KXB & Mike, KA4RRU

Single Operator Assisted

World - CQ MAGAZINE
Continents - Open

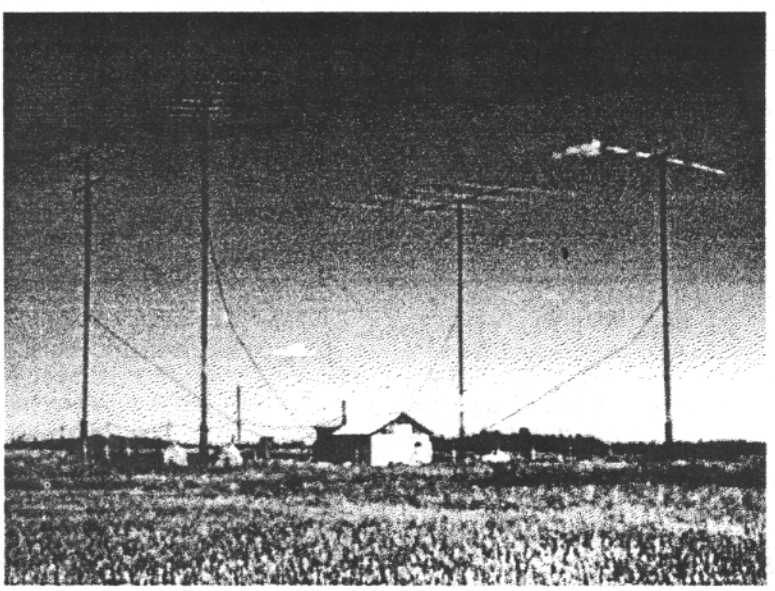
Multi Operator Single Transmitter

World - AEA, Advanced Electronic Applications, Inc.
Continents - Open

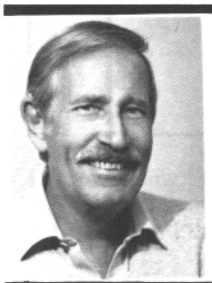
Multi Operator, Multi Transmitter:

World - CQ MAGAZINE
Continents - Open

There are many plaques looking for sponsors, Single Band, a specific country, Multi Op by continent etc. If interested contact the Contest Director.



Antennas used in CQWW contest at UQ0A. Photo by DJ6DK



DX NEWS

John Troost, TG9VT
444 Brickell Ave., Suite 51-265
Miami, FL 33131-2492

For years I have wondered why the RTTY JORNAL only comes out 10 times per year and no JOURNAL in June and July. Well, the answer is obvious now; look at the propagation over the last 3 months. So what is there to talk about? Certainly not enough to publish a DX Column for these months. So I do not begrudge Dale, our Dear Publisher, and his vacations.

All kidding aside, the propagation was such that even if one rare DX had been up, it would be an exception if you could have heard it, let alone go work it. The future looks a little more attractive. Seems there is quite a bit of rare DX to come and possibly a bunch of New Countries may be added to the DXCC list.

JUNE/JULY HAPPENINGS

In spite of all my griping, a lot of good DX was around quite regularly; two expeditions to the S. COOK ISLANDS; ZK1CQ by Ron Wright and ZK1RY by a Swiss group (wish they had picked ZL8, KERMADEC instead.) 3B9FR, RODREGUEZ ISLAND, was active quite often around 1300Z, from here over the long path on 15 and 20M as was 4S7RM, Ron, from SHRI LANKA.

Anyway, about a two inch pile of notes has accumlated here and amongst these, there were such goodies as 9X5LJ, 7X3DS, who gave lots of DXers a New Country, Z21GZ, VQ9TB, T77T, P29BT, FS/JH4ADK, 3X1FG (now accepted by the DXCC desk), FG4FI, FG5AO, 7Q7LA, AP2JA, AP2NK, ZC4KS, CN8GI, VP8BFH, 4K2OIL, RA2FB, RC2AZ, RO4OA, UF6FJ, UI9ABV, RI8BP, RJ1S/UT9GWA, UM9MU, RL7RBU, UL7MU, LY1BY, LY2WW, LY2WR, YL2JW, YL2JN, RH2LT, HH2BZ, VP5JM, BV5OC, FK8BG, FK8BK, JY9SR, V85GA, ZD8VJ, ZD9BV, 9V1QG, YI1BGD, A41KB, A61AD, A92DQ, EA8ATE, EA9TL, EA9MY, CU2AZ, 9V1VN, OD5NG, TY1PS, STØDX (Temporarily QRT due to gear problems, but will be there a long time), J39BS, J37WA, TK5IU, HS1BV, HSØAC, 9M2FO, 9M2MW, FB8WZ (Crozet, W.F.W.L.), VK4KAE, V44KW, V47RF, SVØCR, SV5TS, SV9AKD, PZ2AC, 5Z4BH, 5Z4BI, 4U1UN, CN8NS, VK9NS, V51P, V51DF, 5W1KM, 5W1CW, SU1DZ, 9K2EC, 9K2DZ, TU2BB, TU2YK, V63SY, YN1CB, DU1AUJ, YC1YMN, FR5SL, TJ1MR, EP2ASZ (also W.F.W.L.), HZ1AB, PJ2MN, PJ9LS, VS6EP, FS/KB4VHW, HBØ/OE3GAS, KG4DD, NP2N, 9Q5TE, 3D2MP, A35EA, just to name a few from my bandpass. Many more attractive ones were heard and/or worked, maybe enough to get a special Summer DXCC.

Of course the great event was the expedition to M.V. ISLAND, 4J1FS by a mixed Finnish/USSR group, in late May. That was a completely New Country on RTTY and in spite of many difficulties, quite a success. I had a FAX from Jari, OH2BU, telling me that, in spite of poor propagation, they had a total of 27,000 QSOs, mainly on 20M. Of those a total of 815 were on RTTY, 100+ with North America, and 200+ with Japan. 10 Meters was totally dead and they had a QRN/QRM level of close to S9, even though they moved their operating position all over the island to try and find a quiet spot. They have plans to activate the station again during the Next CQ WW RTTY Contest, but it is not sure if all the paperwork can be worked out in time and all the permits obtained (plus the funds raised).

AMTOR

More and more good DX is coming on AMTOR these days. Seems that AMTOR is now a truly desired mode, which it was not 4 or 5 years ago. You see such great ones as SU1DZ, 9K2DZ, 9K2EC, 9X5LJ, FR5ZD, FK8BK, SVØCR and many others. Some run or use mail-boxes, some run free DX. The AMTOR section (below .080 on each band) is getting very crowded. Here, as well as on RTTY, consideration is required. AMTOR, though a robust mode is still susceptible to "link breaks." If you don't use a scope or other good tuning device, first of all, when you start calling a station, you never know if you are zero beat with him. Secondly, if you start calling without such a tuning device (and I don't mean a cheap light-bar indicator), you will never know if you stepped on a QSO in progress, gaining yourself a lot of unpopularity, which is easy in this hobby anyway. The SARTG Contest proved that a fine Contest can be run on AMTOR which gained a lot of prestige for this mode. We are sure to have another contest next year.

Of course, the considerate amateur realizes that AMTOR is conducted below .080 on each of the 10, 15, and 20 Meter bands. Specially with discourteous HF Packet operators failing to abide by the "Gentlemen's Agreement" to stay above .100. As a result, the RTTY portion of our very limited band segments is under constant pressure. Please let us AMTOR operators not contribute to this by working above .080 Mark.

How do you know if you are above 14,080 Mark? If you are in FSK, your tuning display on your Transceiver will indicate the actual Mark frequency (except with Kenwood, which indicates Space frequency, 0.170Kz below the actual Mark frequency).

If you are working AFSK, i.e., in LSB, with audio tones injected, your dial will show 2125 cycles higher than the actual Mark frequency.

Confusing? Look at it like this: you want to tune 14,1085.00 Mark. On a "normal" transceiver in FSK that will be precisely what your dial should show. On a Kenwood your dial will show 14,084.83. In AFSK with LSB, your dial will show 14,087.13. Using this method, whether you are in the RTTY band, AMTOR band, or for that matter in Packet, you will always know what Mark (carrier) frequency you are on.

ADIOS

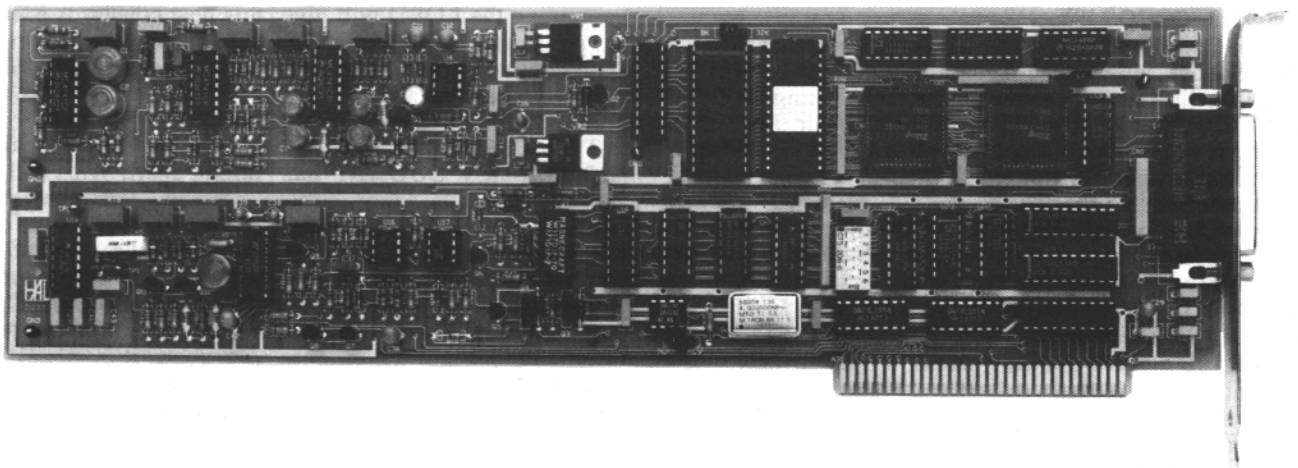
After four power failures, when, in each case, I lost the content of the buffer, this finally seems to rap it up for this month, except the DX Comings. I hope all of you had a wonderful Summer. Next month I will have to try and get the column out a little earlier as I have to be in Boston on 8 September for one of my favorite visits to the Ma. General Hospital. They have "promised" me that they are 90 percent sure they will not have to cut again, so I pray to the LORD for the best.

Many thanks to all of you, who made this DX Column possible. I appreciate any bit of advance DX information to make this Column as informative to the readers as they deserve. Special thanks go to I5FLN, VK2SG, OD5NG, CE3GDN, OH2BU, W6/GØAZT, UT5RP, WA4JQS, and VP8BFH, amongst others.

For this month, GOD bless you and have a good month. I hope that the propagation will do some marvelous things so that you will all reach the RTTY Honor Roll soon. And hope you can make time available to be a DX Unlimited. See you in the Pile-Ups.

de **John, TG9VT** ■

A Winning Combination . . .
The PCI-3000 and SPT-2 from HAL!



The HAL PCI-3000/PC-AMTOR system is designed to put your PC on the HF bands with outstanding performance at an affordable price. Amtor allows you to get through when other methods fail. If you've ever been DX-ing with someone on Amtor when 20 meters dies out in the evening, you know what we mean. Things may slow down, but you can usually keep up the QSO!

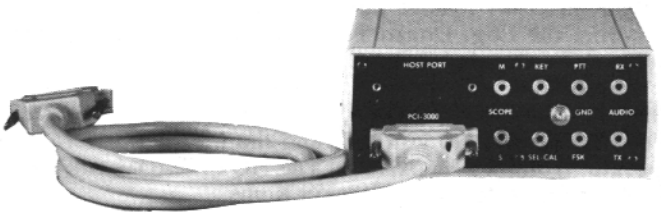
The PCI-3000 doesn't limit you to Amtor. You also get high-performance Baudot and ASCII RTTY, CW, and Search Mode. Search Mode lets you simply tune in the signal—we take it from there. The PCI-3000 automatically finds the correct code, speed, and polarity. No more guessing!

If you want to communicate on HF, do it right with the PCI-3000! Call HAL Communications—your AMTOR source—and put your PC on the air today!

SPT-2 Spectra-Tune:

For ease of tuning your PCI-3000, add the SPT-2 Spectra-Tune. The Spectra-Tune lets you tune in CW and RTTY signals quickly and accurately with a calibrated linear 30-segment bar graph. The bar graph represents a 600 Hz range of the audio spectrum, centered at 2210 Hz for RTTY and AMTOR, and 800 Hz for CW. Calibrated marks indicate the proper frequency for AMTOR, RTTY, and CW tuning.

A cable is included with the SPT-2 for providing power and control from the PCI-3000. The rear panel of the SPT-2 provides convenient "RCA" phono connectors for all radio connections. This avoids having to make radio connections directly to the PCI-3000. Enhance your PCI-3000 system with the SPT-2 Spectra-Tune Today!



HAL Communications Corp.
P.O. Box 365
Urbana, IL 61801
Phone (217) 367-7373
FAX (217) 367-1701

PCI-3000/PC-AMTOR with software **$395.**
SPT-2 Spectra-Tune with cable **$169.**
FIL-1 Amtor/RTTY filter (installs in SPT-2) **$69.**

(Low tone export models available.)

DX COMINGS

by John, TG9VT

Well, first of all what did not go: TI9JJP, COCOS ISLAND, could not get his IRDXA furnished HAL Telereader out of customs for love or money, and IRDXA is still waiting to get the gear back from San Jose, Costa Rica. That, added to Bhutan and Bangladesh, makes for a few expensive cancellations.

Then nothing has been heard from 5R8AL, Alain, MALAGASY REPUBLIC; some reports on SSB and CW, nothing on RTTY.

Another disaster was the RTTY gear furnished by IRDXA to Jack, W4IBB, for his return trip to ETHIOPIA, ET2A. The return trip was very successful, but the RTTY gear did not make the trip.

Had the nicest letter from Tony Di Prato, WA4JQS, regarding SOUTH SANDWICH. The expedition is delayed due to problems with air transport to Port Stanley, Falkland Islands. The group now has to go over London to Port Stanley and there catch the Chartered vessel, the MV Abel J. to take them to SOUTH SANDWICH on or about 3 March 1992, with 8 operators for two weeks, all bands and modes, using four separate stations, RTTY included of course. RTTY cards to Joanie, KA6V/7. One thing they are emphatic on! An insurance contact is okay, but if you make more than 3 QSOs per band per mode, the computer will automatically remove your call from the Log. Donations please to Jerry, AA6BB/7.

The intrepid Eddie, W6/GØAZT plans to visit and operate from V2A, ANTIGUA, from 26 to 30 September, including the CQ WW RTTY Contest. As Eddie says, no chance of winning, but fun; pretty modest, no?

WB8RJX wrote me that he has donated as MFJ unit to KHØ/KB4TXM, SAIPAN, who should be on RTTY/AMTOR on a regular basis soon. Thanks Terry.

KE2AA reports that he visits JOHNSTON ISLAND, KH3, many times during the year. He has RTTY gear there and will operate whenever he has time available.

Had another nice letter from Bob, VP8BFH. He explains that he would love to go and operate RTTY from SOUTH GEORGIA and had planned to hitch a ride with the South Sandwich crew, but now the decision has been made that they will only go to South Sandwich and now the whole thing has been delayed until March 1992. Bob is trying to find other alternatives; not easy in that part of the world.

The rumor persists that HLØPOL, SOUTH SHETLANDS hopes to go on RTTY any day now. Thus far, not a chirp.

A lot of the guys missed the 1AØKM operation from THE MILITARY ORDER OF MALTA during the Dayton Hamvention. Now their QSL manager, Tony, IØIJ, reports, that another operation is well possible during the 1991 Christmas Week. Further on this subject, the SMOM has reached an agreement with the Government of Malta, which they governed until Napoleon evicted them in 1798, that the SMOM will get exclusive use of a Fortress, a palace and a church in Malta as independent territory. If this will be ground for a New Country will depend on the precise terms of the agreement between the SMOM and the Maltese Government. The HQ of SMOM will remain in Rome.

As to BURMA (MYANMAR), XZ, it seems that Romeo is all set for late August/early September (probably just when I am in the hospital), to activate this super-rare place, providing he can get the funding (via Ed Kritsky, NT2X.) Four operators and two transmitting sites will give you a fair chance, providing the LORD will give us propagation. The ARRL DX Desk has already accepted Romeo's documentation.

STØDX, Dennis, in the SOUTHERN SUDAN, has been moderately active on SSB. His RTTY gear is still under repair, but he expects it back any day now and is really anxious to get back on RTTY.

And last, but not least, there will be a brand New Country on RTTY. Due to the efforts of Micky, CE3ESS, and Don, CE3GDN, with help of the IRDXA, ST FELIX, XQØX, will be on the air, starting late this year. Juan made one trip to St Felix and made many DXers happy, but this time it will be RTTY!

NEW COUNTRIES

Now the ARRL has approved PENGUIN ISLANDS as a new DXCC country (albeit by a slim margin) and also NORTH KOREA at the start of the first operation there (whenever), it behooves us to take a look at what other countries my fall in line for approval for DXCC.

First of all, there is an enclave of the Vatican, LORETO, 125 miles from Rome, near Ancona in Central Italy. This place has been active, some 600 QSOs since March of this year (not yet RTTY), under the call-signs HVØHH. They have forwarded documentation to the ARRL. It is based on being more than 75 miles from the Vatican.

Then documentation has been submitted for last years KJ5/AH3C to JARVIS ISLAND, submitting evidence that JARVIS ISLAND and PALMYRA are separate countries for DXCC purposes.

Then NORTHERN SOMALIA, 6Ø, has declared independence from the rest of the country and calls itself the SOMALILAND REPUBLIC. If this new country is internationally recognized, there is no doubt that it will qualify for DXCC Country status.

YUGOSLAVIA appears to be falling apart. What will happen only the LORD knows. This country is a Federation of small independent regions. If my history classes serve me well, there are Serbia, Croatia, Bosnia, Hercegovina, Macedonia (not the Greek part), Motenegro and Slovania. This has the potential to break up into seven separate Countries, in spite of all the efforts by the E.C., the USSR and the USA to stop it.

Czechoslovakia has the potential to break into two countries according to historic lines. Enough noise is being made.

Then there are rumors of a Republic of ERITREA at the Red Sea.

Again there are rumors that the DXAC is re-examining the position of 4U1VIC, in VIENNA, a UNITED NATIONS ENTITY, which even has its own separate Postal system and is not subject to the laws of Austria.

Then there is an island in the Black Sea, called SNAKE ISLAND, 4K5SI. This island is administered by the Soviet Republic of Russia, but it's separated from it by the intervening Ukraine. NO application for New Country Status has been submitted to the ARRL, but it might qualify for New country under the current application of the Rules.

I may have forgotten some of the potential new ones, but it is anyones guess how many new countries will become part of the DXCC Country List over the next years and like a house wife, a DXers work is never done.

73 and GL de **John, TG9VT**

THE LINK

Jim Jennings, KE5HE
Rt 2 Box 165E
Hearne, TX 77859

Welcome to this new column. The focus of this column will be primarily on APLINK, software which provides for a link between AMTOR and PACKET. APLINK was developed, and is continuously being upgraded, by Vic Poor, W5SMM. The main purpose of the column is to pass along the details of APLINK and to provide a forum for your input and suggestions so that we may improve APLINK.

I am an APLINK sysop, having started operation in December 1989. My system (MBO) is intended primarily for NTS traffic, although I welcome and handle a fair amount of personal traffic. As you check around on the bands, you will find MBOs having different objectives.

This month I will pass along suggestions about logging into an APLINK station and how to begin to use the system effectively. So this month, I plan to help the beginner. Those of you that are already familiar with AMTOR and APLINK stay tuned. In succeeding months, I will go into more of the details of entering traffic or messages and even how you can easily set up your station as a personal or public APLINK system.

GETTING STARTED AS AN APLINK USER

All APLINK stations use the AMTOR mode on HF and most use PACKET on VHF or UHF. If you happen to be close enough to be able to connect with an APLINK station on PACKET, you will find that APLINK in that mode looks more like PACKET BBSs. The command set is an abbreviated version of what you will see on most BBSs. Most of you will be familiar enough with that to get by for a while, so this month I will concentrate on the HF or AMTOR side of the system.

USING THE ARQ MODE

Using APLINK on the HF side requires the use of the ARQ AMTOR mode. Since each of the different controllers, i.e. PCI-3000, PK-232, KAM, AMT-1 etc., have their set of commands, I will leave it up to you to become familiar with the operation of your particular controller and the associated software on AMTOR. I find that it is best to start by working with a buddy who is familiar with AMTOR. Try the FEC (Forward Error Correcting) mode first, then go to ARQ (Automatic Repeat reQuest.) ARQ is sometimes disturbing if you haven't used it before because of the pulsing nature of the mode. Most hams get concerned with their transmitter pulsing on and off. A little patience will have its reward.

In the process of getting familiar with ARQ, you will learn about the SELCAL. The SELCAL is a 4-letter identifier that is used by the controller while in the ARQ mode. Normally the SELCAL is the 4 letters of your call. If your call has more than 4 letters, it is the first and last three letters. If your call has less than 4 letters, the first is repeated. There are no numerals in the SELCAL.

You will also have to become familiar with the tuning of an ARQ signal. This is a very important step in using AMTOR. A scope is the best tuning device for the digital modes. If you don't have a scope, learn how to precisely read your tuning indicator so that you can get on frequency. In addition, you will have learned the dial reading on your radio that corresponds to frequency of your mark tone. If you are running AFSK and using LSB on your rig, you will add 2.125 khz to the desired mark frequency. That is, if you want to call someone on 10128 khz mark, you will set you dial to read 10130.125 khz. If you are using FSK, most radios read the mark frequency on the dial, so in the above example you would simply dial in 10128 KHz.

LOG- IN ON AN APLINK MBO

In order to check into an APLINK station, you need to get on a frequency that the MBO scans and chirps (ARQ call) his SELCAL. For example, chirping KEHE on 10128 MHz mark should bring up the KE5HE MBO. However, before doing that you should set the answer-back response in your controller so that you can take advantage of the automatic log-in procedure of APLINK.

The automatic log-in procedure of APLINK works with registered stations having the automatic answer-back (AAB) enabled. When you first link with the system, it seizes the link, identifies, sends a 'WRU' character (FIGS-D), and waits for an answer-back response. The expected response is: 'QRA CALL SELCAL+?' or 'DE CALL SELCAL+?'. For example 'QRA KE5HE KEHE+?' or 'DE KE5HE KEHE+?' are typical responses. Such a response must be set in your controller as the answer-back text in order for the automatic log-in to work properly.

The first time you check into an APLINK station or if you don't have the AAB enabled, the system sends a manual log-in request followed by the +? sequence. At this point the user should send either 'LOGIN (CALL)(CR/LF)' or 'LOGON (CALL)(CR/LF).' CALL is simply your call letters and CR/LF is just ENTER or RETURN on your keyboard. For new users with AAB enabled, the system will ask you to confirm your CALL. Answering 'YES' will cause the call to become registered and the log-in procedure will be automatic on subsequent links with that MBO.

AFTER THE LOGIN

Using W5HAM as the call of the user and K5MBO as the call of the MBO, the MBO sends the following line after it recognizes a valid LOGIN:

W5HAM DE K5MBO QRU GA+? or
W5HAM DE K5MBO QTC 3 GA+?

The first line above indicates that the MBO has no traffic for the user while the second indicates that 3 unread messages are on the system for the user. Each line also indicates the call of the user, if that is not your call, you should log-in again on the next line. The 'GA+?' is the 'GO AHEAD' prompt followed by the standard +? ARQ changeover command which puts the user as the Information Sending Station (ISS). APLINK always sends the 'GA+?' prompt when it is ready to receive a command. The sysop of the MBO may also put a system message containing important information in the above response.

SENDING A COMMAND

The following is from the AMTOR help file of APLINK:

Type any of the following commands on a new line and end with either (CR/LR) or the +? sequence (but not both.) If you do not use the +? sequence, the system

will change the direction of the link for you when it recognizes a valid command. (Note: I have found that it is better for new users to use CR/LF instead of the +?. When you do that, the MBO will not become the ISS unless it receives a valid command. That is, the link does not changeover until the MBO recognizes a valid command. When you use the +?, you will have made the MBO the ISS and if it does not recognize what you sent as a valid command, then it will respond with ?? +?. This means that the MBO did not understand your command and you need to re-enter a valid command. AMTOR is not an error free mode, even though you sent a valid command, the MBO may not have received a valid command.)

- **LOGIN (YOUR CALL) - Logs you in**
- **LOGON - Same as LOGIN**
- **LH - Lists all HELP files**
- **LTO - Lists all Messages to you**
- **LFM - Lists all Messages from you**
- **LB - Lists all Bulletins**
- **RN - Reads all NEW MESSAGES addressed to you**
- **R (NUMBER) - Reads MESSAGE (number)**
- **SP (CALL) - Send a MESSAGE to (Call), end MESSAGE with NNNN — on a new line**
- **T - Talk with SYSOP**
- **I - Information about the system**
- **LOGOUT - Logs you OFF**
- **LOGOFF - Same as LOGOUT**

Don't worry about doing any harm by sending a bad command or something wrong that might screw up the system. It is well protected from that kind of problem. You will learn by trying and doing. It is always helpful to have a printed copy of the help files, so if you take the time to download the help files be sure to save a copy or have your printer turned on. When in doubt, read the manual! Another valuable file found on most APLINK MBOs is the APLINK.DIR prepared by WA8DRZ, Craig, in San Francisco. That file, now in 2 parts, contains a listing with frequencies of most of the APLINK stations around the world. Use the LB command to get a listing of the bulletins.

SOME COMMON PROBLEMS WITH NEW AMTOR USERS

1. Have difficulty getting on frequency. (On many MBOs, you need to be within 50 Hz for a good link.)

2. Have difficulty in setting the AAB response. (Consult your controller/software manual.)

3. Have problems with RFI in controller/computer. (Observe good grounding and shielding practices.)

4. Have poor quality tones when using AFSK. (On some radios, you need to disconnect the microphone while using AFSK.)

SOME DO'S AND DONT'S

1. Obey the cardinal rule of Radio Communications: DO NOT TRANSMIT WHEN THE FREQUENCY IS IN USE!
2. Limit your linked time on an MBO to 15-20 minutes as a courtesy to others who might want to read their messages.

3. Do use 170 Hz shift if possible, especially on transmit.

4. Use 500 Hz filters if possible after linking, to improve throughput.

73 FOR NOW, GOD BLESS

de **Jim, KE5HE** ■

SOME APLINK STATIONS AND FREQUENCIES (partial)

(Note: all frequencies are mark tone frequency)

AMERICAS

K4CJX.TN.USA.NA KCJX, STEVE, NASHVILLE 7070.5, 10128, 14068, 21073.5

K7BUC.AZ.USA.NA KBUC, DEL, PHOENIX 7071, 10140, 14071.5

KA0JRQ.IA.USA.NA KJRQ, LARRY, OMAHA 7071, 10128, 14071.5, 21074, 24915, 28074

KB1PJ.NH.USA.NA KBPJ, DAVID, BOSTON 3625, 7071, 10140.5, 14070.5, 18102.5, 21074

KE5HE.TX.USA.NA KEHE, JIM, COLLEGE STATION 3622, 7069, 10128, 141070.5, 18105.5, 21072.5, 24915, 28125

KK4CQ.FL.USA.NA KKCQ, HARVEY, PENSACOLA 14072.5, 21072.5, 28125

N0IA.NV.USA.NA NNIA, BUD, LAS VEGAS 3625, 7069, 10128, 14072.5, 21072.5, 28128

TG9VT.GTM.NA TGVT, JOHN, GUATEMALA CITY 14069, 18105, 21074, 28074

VE3IUI.ON.CAN.NA VIUI, ROBIN, TORONTO 7071, 10140.5, 14068.5, 21081

W1FYR.NH.USA.NA WFYR, ALAN, GILSUM 3622, 7071, 10128, 14072.5, 18102.5, 21072.5

W3GL.DE.USA.NA WWGL, RALPH, NEW CASTLE 7071, 14068

W7DCR.OR.USA.NA WDCR, GARY, LA PINE 3622, 7069, 10140.5, 14070.5, 18105.5, 21072.5, 24915

WA1URA.IN.USA.NA WURA, FRANK, FORT WAYNE 3622, 7071, 10140.5, 14071.5, 21076, 24915

WA8NTF.MD.USA.NA WNTF, GARY, FORT MEADE 14072.5, 14075.5

WA8DRZ.CA.USA.NA WDRZ, CRAIG, SAN FRANCISO 10140.5, 14068.5

WB8APD.OH.USA.NA WAPD, DAVE, CLEVELAND 14071.5

ZFIGC.CYM.CAR.NA ZFGC, FRANK, BODDEN TOWN 14069.5, 14073.5

WORLDWIDE

9K2DZ.KWT.AS KKDZ, ABDUL, KUWAIT CITY 14076.5, 21076.5, 28076.5

DL0YB.DEU.EU DLYB, WERNER, HAMBURG 14075, 21075, 28075

GB7SCA.GBR.EU BSCA, JOHN, PLYMOUTH 3589, 7038, 10145, 14075, 21081, 28075

JA5TX.JPN.AS JATX, MITSUO, KOCHI 14071, 14074

PA0QRS.NLD.EU PQRS, PIET, ROTTERDAM 7040, 14070, 14072

VK2AGE.NSW.AUS.OC VAGE, GORDON, LISMORE 7045, 14075, 21076 (BEAM 0000-0600 NA, 0600-0700 AF, 0700-1030 AS, 1030-1200 NA, 1200-1830 EU, 1830-1900 NA, 1900-0000 EU)

CLASSIFIED AD DEPARTMENT

First 30 words $7.50, additional words 10 cents each. Cash with ad. Deadline for ads is 1st of month of publication. (Example - Ad arrives by 1st of September will be run in the September issue)

CQ Magazine (now including Ham Radio) — The Ham's magazine. All year long CQ brings you the best writers, the best reading in Amateur Radio. Written and edited to be enjoyed as much as you enjoy, Ham Radio itself. Subscribe now and see for yourself. One year $22.95 U.S., $25 Canada/Mexico, $27 Foreign. Contact CQ Communications, Inc., (also publishers of Popular communications, Modern Electronics and Electronic Servicing & Technology), 76 North Broadway, Hicksville, NY 11801, Phone (516) 681-2926.

HENRY RADIO — Your Data Communications Place. If you are looking for new data communications gear, come in or call for quotations. We are distributors for HAL Communications, AEA (Advanced Electronics Applications and others. PK-232s, ST-8000s and PCI-3000s in stock. Call Henry Radio at (213) 820-1234 in Los Angeles or (800) 877-7979 outside California. Ask for Fred, N6SFD.

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. You would need to reference many publications in order to obtain the same information contained in this booklet. Why do that? Send $5.00 to the *RTTY Journal* and you will receive a copy of this invaluable booklet by return mail, post paid.

NOW AVAILABLE: *RTTY Journal* INDEX for years 1984 thru 1990. If you are tired of looking through back indexes or issues for an article you wish to re-read, then you will want to have this new INDEX in your shack. Order today, by sending $2.00 to the *RTTY Journal* and we will rush your copy to you. The Index also contains a handy order form for ordering back issues that are available.

IBM-PC RADIO COMMUNICATIONS SOFTWARE! With new CONTESTING features: mouse support, automatic duping, log default entries, much more. CompRTTY II/PK for the PK-232; or original CompRTTY II for RTTY/CW with standard TUs and all modes with KAM or MFJ-1278. Numerous features including: adjustable split screen display, break-in buffer, file transfer, 24 programmable messages. CompRTTY II/PK uses host mode for complete control of PK-232 including new mailbox feature! Complete printed manual. Ideal for MARS, traffic handling, RTTY pictures. $65 either version, $95 for both. Mention RTTY JOURNAL and take $5 off. Send call letters (including MARS) with order. David A. Rice, KC2HO, 144 N. Putt Corners Rd., New Platz, NY 12561.

WANTED: 11/16 paper tape & teletype roll paper, can use large quantities. Unused Teletype spare parts (M33, 35, 40, 43, 4500 only.) **FOR SALE:** Teletype equipment and parts, all models. For Commercial and Amateur use. Large stock. Call/write/FAX: VAN, W2DLT, Teleprinter Corp., 550 Springfield Ave. Berkeley Heights, NJ 07922. Ph: (908) 464-5310, FAX (908) 464-4289.

THE SPEC-COM JOURNAL - Do you desire "more" DIGITAL information? Have you seen our new look and our latest issues? Full color covers, whiter paper, 72 pages per issue, LASER typesetting, on-time delivery, new column editors and authors. We cover ALL MODES of Specialized Communications: FSTV, SSTV, FAX, RTTY, AMTOR, PACKET, OSCAR, SHORTWAVE MICROWAVE and COMPUTERS. Published six times per year (bi- monthly.) Try a sample issue - only $3.50 ppd. Annual (2nd Class mailed) subscription rates: $20 USA, $25 Canada/Mexico, $30 DX (Surface). Contact SPEC-COM Communications & Publishing Group Ltd, POB 1002, Dubuque, IA 52004-1002 or call (319) 557-8791 or via Modem at (319) 582-3225.

Like to operate RTTY? Don't care about Packet or AMTOR? Then you need RTTY- PC, the best RTTY program for the IBM PC and compatible computers! Not a terminal program to operate an expensive multi-mode controller, but a genuine Baudot RTTY program (also works on ASCII.) All you need is your computer with an RS-232 (COM) port, and a low cost interface (TU or radio modem.) Still easy to use, yet with all the features and our 45 day no- questions-asked money back guarantee if not satisfied for any reason! RTTY- PC version 1.07 is only $29.95 + $3.00 S/H (free S/H if ordered by mail.) Manual is on disk; bound manual $6.00. Please write for our free info sheet. VISA/MC accepted. Comtech Research, 5220 Milton Rd. Dept. 2, Custar, OH 43511 (419) 278-6790.

NEWS — NEWS — NEWS — NEWS

Amateur Radio's Newspaper "WORLDRADIO." One year subscription is only $15.00. Contact: WORLDRADIO, P.O. BOX 189490, Sacremento, CA 95818.

FOR SALE: INFO-TECH M6000 $600, M600 $400, M800 $290, M610 $250, HAL ST6/KBD/RVD1005 $250, AEA-MBA-RC $100. Bob, WS1J, POB 391 Simsbury, CT 06070.

FOR SALE: Hy-Tower antenna. This a 10 thru 80 meter vertical. Sells new for about $600, asking $200. It does need a few parts. This is all antenna, not a tower, the unit is insulated from ground and uses radials. Call Dale, W6IWO (714) 847-5058. Cannot ship, must sell in area local to Los Angeles.

JOIN THE XTAL SET SOCIETY: Dedicated To Once Again Learning About and Building Amateur Radio Gear. $6 brings membership, (4) quarterly Newsletters, and a complete set of plans to build a "Modern Day Crystal set." W0XI, RR #1 BOX 129A, Lawrence, KS 66044.

RTTY JOURNAL

9085 La Casita Ave.
Fountain Valley, CA 92708

SECOND CLASS
POSTAGE PAID
SANTA ANA, CA
92799-9998