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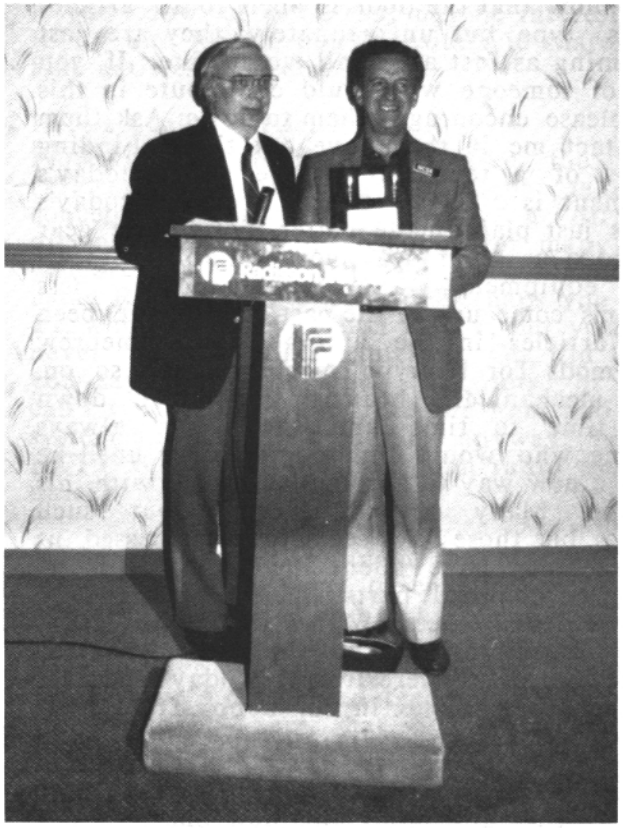
VOLUME 36 NUMBER 5 MAY/JUNE 1988

DAYTON DOES IT ALL



Roy, KT1N presents CQWW/RTTY JOURNAL Multi-op award to Ted, HC5K at RTTY dinner, leader of 1987 effort from Galapagos Islands

Roy, KT1N presents CQWW/RTTY JOURNAL award to Barry, W3FV for Single-op top score North America at RTTY Journal hosp. suite

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DX FROM GALAPAGOS PACKET SARTG 1988 RULES

RESULTS OF FIRST ANNUAL CQWW/RTTY JOURNAL RTTY CONTEST - SEP. 1987

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Dale S. Sinner, W6IWO
OWNER - EDITOR - PUBLISHER

ALL CORRESPONDENCE TO:
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TELE: (714) 847-5058

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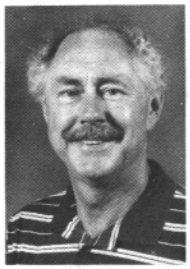
ABOUT THE COVER

One of the highlights of the 1988 Dayton Hamvention was the presentation of awards for the 1987 CQ MAG/RTTY JOURNAL WW RTTY Contest. Having some of the winners at Dayton was a real treat and Roy, KT1N (Director of this particular contest) took full advantage by presenting those present their award.



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

HITS & MISSES

The amount of material coming in to the Journal has been fantastic and I really do appreciate this support. But sometimes it gets to be a real job to make it all fit. It all started last month when I had to put contest rules on the front cover. This is a No, No, for sure, but with no way to go, I did the best I could. Now this month I find myself in the same predicament, to much material and not enough space. What to Do? Well, I found a way out and I hope you will bear with me. A little lighter paper is being used and another four pages are being added to this issue. I hope the additional coverage will offset any inconvenience this lighter paper may case due to bleed through.

While I'm apologizing, let me also say that this time of the year there is a great deal of RTTY contest information to publish. Some of you may think, that is all I have on my mind but that's not so. These contests all run so close together that they end up appearing here in the Journal at the same time. And, I also want to publish the results of the different contests, otherwise a participant might not ever know how he/she faired. This month you will find the results of the first annual CQ Mag/RTTY Journal WW RTTY contest. As you will probably recall, this first contest was a real success with over three hundred logs received. Those results take up three pages using the smallest fonts at my disposal.

The Dayton Hamvention was a great success in my opinion. The RTTY gang really turned out in force. The Digital Digest forum was well attended again and the RTTY dinner had nearly fifty people attend. I'll have more on Dayton in the next issue. A special thanks to Jerry Trickter, WA1IUF for hosting the RTTY dinner and next year your host will be Roy Gould, KT1N.

From time to time I have had requests for more "hands on" articles in the Journal. I want you all to know that the door is open to all articles of this type but unfortunately they are just not coming as fast as we all would like. If you know of someone who could contribute in this area, please encourage them to do so. Ask them to contact me if they have questions. Finding articles of a technical nature about today's equipment is difficult simply because today's gear is just plain made better. Solid state gear has added a great deal more reliability to all Ham equipment and consequently less problems come up. In the past, there have been many articles in the Journal on homebrew TU's, mods for teletype machines, and so on. Those mechanical beauties did break down from time to time and there was always someone who would tinker and tinker until he found a new way to accomplish a goal with his machine. Many articles were about such subjects but those days seem to have passed us by. We now have silent machines with no moving mechanical parts to speak of and so our troubles are less. With all these things in mind, please understand that the Journal is still here to help where it can. Today's articles represent the changes in our hobby from what it was just a few years ago. We are simply trying to keep pace with the state of the art and not fall behind in our content. Bear with us, learn with us, and enjoy this new phase of our Ham radio hobby.

Don't forget the CQ Mag/RTTY Journal WW RTTY contest coming up again on September 24 and 25. Mark your calendar and try to be with us to maybe set a new record for contesting. All the rules will be in the next issue of the Journal. If you would like logs, they may be obtained from either CQ magazine or from the Journal office. Please include an SASE with your request.

Until next month, 73's ... **de Dale, W6IWO**

Dick Uhrmacher
K0VKH
212 48th ST
Rapid City, SD.
57702

MSO'S

As I write this months column, I'm busy stuffing essentials into my suitcases, for the annual trek to the Dayton HAMVENTION! I hope to have some of the highlights of this journey in the next months MSO column. In the April column, we featured the sophisticated digital station of Gaylord, WB8ICL, and in the next two issues, his XYL Louise, WB8JIB, has written a very nice article aimed at attracting YL's to this fascinating MSO world of ours. So, if you know of a YL that may be interested in RTTY and MSO's, don't hesitate to share these fine articles with her.

Here's Louise's article.

Now is the hour! Sounds like the Maori farewell song, doesn't it? But let's take that concept of "now" and give it a different dimension. A new dimension for many YL's who are now using RTTY, or are contemplating using RTTY in the future. Perhaps you are a YL who's OM is active in RTTY, but you have never been all that interested. Oh, did I hear you say you can't type? Well, lots of OM's can't type either - they use the hunt and peck system and have a great time anyway, because RTTY is another facet of ham radio that can quickly become addictive.

RTTY offers one advantage that no other mode of communications can offer, use of an MSO. The OM's have had the pleasure of the MSO's for many years, and I think it is time for the YL's to have one for their own use. If we (the YL's) have a designated frequency to use, and are reasonably sure that we will find other YL's there, we may find that this opens a whole new world for us. This is the reason that MSOJIB is now on the air for YL's. MSO's are identified by the last three letters of the operator's call. One of the most convenient aspects of an MSO is that you can remain in touch with other RTTY friends without being restricted to a specified time and frequency. So let's get with it and define terms we will be using in discussing the subject.

RTTY: A form of telegraphic communication employing typewriter-like machines for generating and receiving a coded set of electrical impulses. Today we use computers and other modern equipment.

MSO: Message Storage Operation. Also known as "mailboxes". Can be hardware, (equipment made especially for RTTY use), or software, a computer program used by a computer. We, WB8ICL (OM), and I,WB8JIB, are using software for the IBM and/or IBM clone, written by Clark, W9CD, which has been performing flawlessly. A method by which hams who are using the RTTY mode of communication can store (and retrieve) messages for (and from) other hams who are using RTTY. Storing and retrieving messages are done at the leisure of the operator, eliminating skeds, which at times can be inconvenient or impossible because of conditions, etc.

SYSOP: System Operator, a ham who operates a MSO.

INTERFACE: The connection between your computer and radio which performs all of the "magic" of establishing data and text communication between your station and other stations so equipped. It is also referred to by some manufacturers as a "data controller".

BAUDOT: Refers to the data code being used. The two most common uses of Baudot are 45 baud, (60 WPM), and 75 baud (100 WPM). All SYSOP's use 75 baud for the MSO's on the National Autostart Frequency, but this does not preclude the use of a different baud for MSO's on other bands and frequencies. If however, you are using RTTY and looking for a QSO on a frequency other than the Autostart Frequency, change to 45 baud.

SHIFT: The difference between the Mark and Space frequency is 170 Hertz, referred to as the "shift". This is the normally used for MSO operations.

MARK AND CARRIER FREQUENCIES: Will be determined by your radio, so you should refer to your manual. The National Autostart Frequency carrier frequency is 14 087 750 Hertz, and the Mark frequency is 14 085 625 Hertz. This frequency is shared by twelve MSO's across the nation, and by one DX MSO (in Guatemala). Unlike other situations where a shared frequencymight produce QRM, the MSO's have experienced only minor problems, and these have been due mostly to band conditions.

MODULATOR: Frequency shift keyer which converts pluses and allows them to be sent to a distant point where they are received by a demodulator.

DEMODULATOR: A receiving converter which converts the incoming signal into words on your video monitor. **(cont. pg. 4)**

(MSO's cont. from pg. 3)
CARRIAGE RETURN: Use of the key on your keyboard which may be named "Return" or "Enter". This will "left justify", or place at the extreme left of the monitor the next command or print. This left justifying is very important. Failure to left justify before giving commands may be one of the reasons that you would have difficulty activating a mailbox.

Now that we know some of the RTTY vocabulary, let's discuss the equipment needed for a RTTY station. The bare necessities are a transmitter, receiver, interface, computer/other equipment, and video monitor. A scope for precise tuning and a printer for printing out what you see on your monitor are worthwhile investments. As far as antennas are concerned, most operators run between 50 and 100 watts, so the antennas you already are using will suffice.

Where can you find MSO's. The National Autostart Frequency for mailboxes is on 20 meters, 14 087 750 Hertz (carrier frequency). You MUST be within 40 Hertz of the proper frequency as SYSOPS use very selective receivers and demodulators. For example, our station uses a 250 hertz CW filter and a HAL ST-6000 demodulator. This is typical of stations operating on the Autostart Frequency. In addition, in order to prevent drifting, most mailboxes are crystal controlled.

In next month's installment, Louise, WB8JIB, discusses how to access the MSO's, interogate them, and other pertinent facts.

MSO MAIL BAG

This month's mail brought several nice letters, (keep them coming Gang!), the first of which is from George Speers, WA8WMS. George writes that he is running a RTTY mailbox at his QTH, (HAL PCI-2000 RTTY System in his IBM clone computer, with the very popular W9CD MSO Program), through the Fenton, RTTY Repeater. This is an open RTTY repeater, located in Fenton, Michigan, and operating on 144.61 Mhz input, and 145.21 Mhz out. The system is running at 45 baud, (60 WPM), 170 hertz shift, with 25 watts output. For future information on this fine system please contact the trustee, Red, K8CWM, or the Livingston Amateur Radio Klub, P.O. BOX 283, Howell, Michigan, 48843.

I also received a very nice letter from Greg Hardesty, KA4LSQ, Louisville, Kentucky, explaining his long absence from RTTY. It seems that Greg had an unfortunate visit from Mr. Lightning Bolt last Summer, and it fairly well worked over his Ham station, as well as other equipment in the house. Greg gives some first hand testimony as he observed this blue bolt stab down at his house, and literally blow up the Ham station. Even though his equipment was disconnected from both the A.C. mains and antennas, the lightning strike was so powerful that it jumped around the shack, literally frying much of his equipment. Greg hopes to return to RTTY, and the Midwest RTTY Net, once the trauma of such an event passes! Good luck Greg.

Hal Williams, N6TZ, furnished me with some very interesting antenna data recently. I had spoken about "computer RFI" in the shack from non-resonant antennas, and Hal was kind enough to provide me with some first hand information about an antenna described in the February 1984 issue of "73 magazine". Hal experienced computer crashes, and RFI "hash" in his receiver, until he tried this antenna design, and he now says that he no longer has any of these problems. Hal says that he is very pleased with the overall performance of this antenna, and recommends it to anyone else who may be experiencing RFI problems because of their antenna design and proximity.

MSO RAMBLINGS

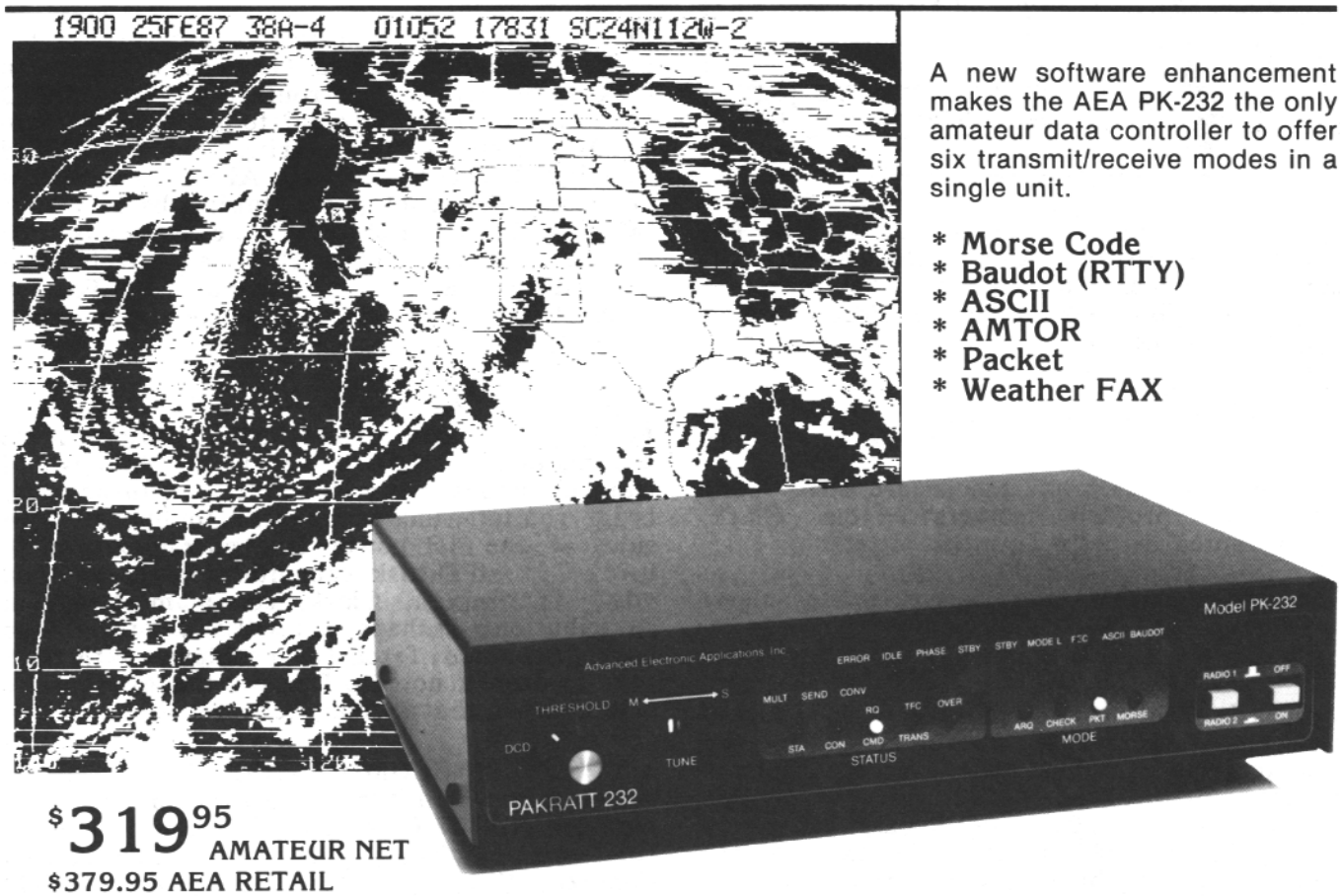
Clark Constant, W9CD, continues to make significant improvement to his "W9CD MSO Program". Anyone desiring to upgrade their old program, or obtain an original copy of this sophisticated RTTY mailbox program, should contact Clark at 2208 S. Race St., Urbana, Il. 61801. Clark furnishes this excellent program as "freeware", and asks only that the end user provide him with a IBM PC 5.25" diskette, diskette mailer, and sufficient postage to return the diskette.

I've had several requests for AMTOR programs designed to run on an IBM PC. If anyone knows of such a program, please drop me a line. -- Keep your eye on the ARRL Board of Directors happenings in the near future, with reference to expanding the SSB portion of 40 Meters downward into the CW and digital area. All digital/CW enthusiasts need to loudly oppose this proposal, or anticipate losing a significant portion of 40 Meters.

That's it for this month Gang. Mr lightning Bolt seems to be visiting more of our friends and acquaintances all of the time. So, it's the time of the year to start thinking about some basic forms of protection. See you after Dayton!
Best 73 **de Dick, K0VKH**

New PK-232 Breakthrough

Six Digital Modes - Including Weather FAX



A new software enhancement makes the AEA PK-232 the only amateur data controller to offer six transmit/receive modes in a single unit.

* **Morse Code**
* **Baudot (RTTY)**
* **ASCII**
* **AMTOR**
* **Packet**
* **Weather FAX**

$319.95 AMATEUR NET
$379.95 AEA RETAIL

Your home computer (or even a simple terminal) can be used for radio data communication in six different modes. Any RS-232 compatible computer or terminal can be connected directly to the PK-232, which interfaces with your transceiver. The only program needed is a simple terminal program, like those used with telephone modems, allowing the computer to be used as a data terminal. All signal processing, protocol, and decoding software is in ROM in the PK-232.

The PK-232 also includes a no compromise VHF/HF/CW modem with an eight pole bandpass filter, four pole discriminator, and 5 pole post detection low pass filter. Experienced HF Packeteers are reporting the PK-232 to have the best Packet modem available.

Operation of the PK-232 is a breeze, with twenty-one front panel indicators for constant status and mode indication. The 240 page manual includes a "quick start" section for easy connection and complete documentation including schematics. Two identical back panel radio ports mean either your VHF or HF radio can be selected with a front panel switch. Other back panel connections include external modem disconnect, FSK and Scope Outputs, CW keying jacks, and RS-232 terminal interface.

The RS-232 connector is also used for attaching any Epson graphics compatible parallel printer for printing Weather Fax. Weather maps and satellite photos, like the one in this ad, can be printed in your shack.

Contact your local AEA dealer today for more information about the one unit that gives you six modes for one low price, the PK-232.

AEA Brings you the Breakthrough

2006-196th St. SW
Lynnwood, WA 98036
(206) 775-7373

Cole Ellsworth, W6OXP
10461 Dewey Dr.
Garden Grove, CA.
92640

CONNECTIONS

By the time this is in print, the Dayton "Big One" will be history. Could not make it this year but may next year. Seems like I say that every year. But our illustrious Editor should bring back some grist for all of his writers to grind.

WE HAVE MAIL

As promised last month, here are some very interesting "problem solvers" from Clark, W9CD, quoted directly from his letter.

"Here are comments on some common problems with Packet TNC's.

PK-80 MODIFICATION

For nearly two years I put up with a PK-80 TNC on VHF whose output data to the computer was scrambled whenever my HF xmtr was transmitting. A PK-232 was free of this problem. Adding 0.001 MFD bypass capacitors to the five PK-80 leads (Ala the PK-232 circuitry) cured the problem with no loss of performance in the PK-80.

The five capacitors were installed between ground and the inboard end of the 100 ohm series resistor in each of the TXD, CTS, DCD, and DTR leads, or R17 thru R21.

PK-232 AFSK TONES

Be aware that the AFSK transmit tone generator (U40) in a PK-232 depends upon a 10 vdc voltage regulator for tone frequency stability, and that such regulators require a minimum of 12.5 volts DC input voltage to maintain regulation under load. Those using an existing power supply marginal in output voltage and current capacity are apt to be plagued with drifting AFSK tones. A.E.A. states the power requirements as 13 vdc at 700 ma. The AC-4 power supply by A.E.A. is rated at 13.0 volts and 1.1 amps, and handles a PK-232 nicely.

Whatever power supply is used, the resulting AFSK tones should be checked, on both VHF and HF, using the calibrate command (cmd:CAL). I have observed several new PK-232's badly off calibration on AFSK tones. This is not so much poor factory calibration but is more likely due to the variation in supply voltage to the XR-2206 tone generator chip.

Once the AFSK transmit tones are correct, the PK-232 receiving demodulator calibration can roughly be verified by routing the TX AUDIO out to RX AUDIO in (pin 2 to pin 1 on J4 or J6 RADIO connector), entering **cmd:CAL**, and stepping between transmit AFSK tones while observing the front panel tuning bar. (Enter "**h**" to get 200 hertz shift.) The circuitry is such that the tuning bar calibration is controlled by the demodulator calibration. Factory calibration of the receiving demodulator seems quite dependable.

TAPR TNC-1 LOCKUP

A TNC-1 is subject to lockup from noise coming in on the AC power line. Mine would hang up about every third time I turned my beam rotator. The cure was to bypass both sides of the AC power line entry to ground, using 0.01 MFD disk capacitors rated at 1000 vdc." Thank you, Clark, for a most useful contribution. Perhaps this will spur others who have discovered fixes for problems with their gear to drop a note to Dale or the appropriate columnist so that all may be illuminated.

KLEINSCHMIDT HISTORY

A note from Dan Testa, 390 Lincoln Ave. (RJ) Newark, N.J. 07104 mentions that he is looking for some "history" on the Kleinschmidt Company (SCN) in particular the AN/UGC-74 (V) combined ASCII/BAUDOT teleprinter. As for Kleinschmidt history, I think that one or more issues of the RTTY Journal back about 10 or 15 years had something about the Kleinschmidt Company. One would have to consult some of the Journal Index issues to try to find this source. I recall very faintly reading something about the company many years ago. The ASCII/BAUDOT machine sounds like it would make a good send/receive terminal for both packet and RTTY or AMTOR, especially with the data rate range of 45.5 to 1200 baud. Write Dan if you can help with his request.

HAL ARQ 1000 FIX

Dean, WA6PJR of Yucaipa, California wrote a note to Dale about a problem he had with his ARQ 1000 on AMTOR. His ARQ 1000 uses the HAL version 1.4 program. Seems if you are in the AMTOR FEC mode and the transmitting operator is sending the usual series of synch signals and then starts sending traffic, the receive screen shows all the correct indicators of incoming traffic but no print on the screen of this traffic.

(cont. pg.7)

(CONNECTIONS cont. from pg. 6)
Dean discovered that the ARQ 1000, and possibly other AMTOR programs, expect to see a CR/LF after the Sync signals and before the traffic starts. Otherwise, it will refuse to print traffic.

If you run into this problem, ask the other operator to send a CR/LF or two before sending traffic and you will be back in business. *(Sending CR/LF at the beginning of a transmission is always good practice anyway, because it ensures starting with a new line and at the left side of the page or screen, something that old timer RTTY operators always did, as they did not have a computer to do it for them! - W6OXP)*

Thank you Dean (and thank you Irv W6GC, for insisting) for sending in this tip. Bet it saves someone some frustration. I think Dean's effort is especially notable in that he solved this himself, after no results from mucho communications with the manufacturer. This brings up the point that you should always pass on your fix/solution to the manufacturer so that he can help others with the same problem. Remember that they are only human too and if they have someone who is really good at long-distance troubleshooting, this person (a rare avis indeed) is quickly hired away by some other firm.

NEW PRODUCT ANNOUNCEMENT

TS-COMM is a recently released Communications and Control System program for KENWOOD Radios - specifically the TS-940, TS440A, TS-811A, TS-711A and the R-5000. TS-COMM is claimed to provide a powerful, fast and comprehensive computer software system for use with Kenwood Radio products. Full control of frequency, mode, memory channels and many front panel controls are supported. Each and every feature supplied by the IF-232 and IF/IC series of Kenwood products is fully supported. System requirements include IBM-PC, PC-AT or true compatible; DOS 2.1 or greater; 512K memory; 1 floppy disk drive; 1 Serial communications port (COM1 or COM2) and an 80 column printer for printing memory data. This program is produced by GRF Associates (not sure of the name) and is available through Ham Radio Outlet in Anaheim, CA. Other HRO locations may also have it in stock by this time. Price class is said to be about $70.

H.A.P.N. SOFTWARE UPDATE AND NEWS

Hamilton and Area Packet Network (HAPN), in their January, 1988 Newsletter announces software updates for the HAPN-1 TNC card (plugs into the IBM-PC bus) to registered users at the rate of $10 for one disk, $15 for two disks, and $20 for three disks (The RBBS software is on a separate disk from the basic software, as is some special programs). They also have a schematic available to add a 4800 baud modem to the HAPN-1 using the boards prototype area to hold the new parts. No hard-to-find parts are needed for this addition and the 4800 baud modulation scheme requires no more bandwidth than does the 1200 baud standard bandwidth. In fact, the modulation scheme is such that data randomization is not required so this reduces the complexity of the new modem.

HAPN is currently trying to incorporate the W0RLI CBBS support into the HAPN-1 board. They are also working on multiple-connect support for this board. HAPN may be contacted at BOX 4466, Station D, Hamilton, Ontario, Canada L8V 4S7.

TONES - THE HIGH AND LOW OF IT

Back in March a note from Russ W6ONK/7 mentioned some confusion with shifts and tones and the attendant definitions. One area of possible confusion is "narrow shift" and "wide shift" and the relationship to "high tones" and "low tones"

Let's start with the RF spectrum as seen at the front end of a receiver. Narrow shift in RTTY practice is usually considered to be about 170 Hz between the two discrete RF frequencies. That is, if the Mark (resting or no keying condition) frequency is at 14.080 MHz, then the Space or "shifted" frequency is (or should be) at 14.080000 minus 170 Hz or 14.079830. Wide shift means the Mark frequency minus 850 Hz. This leads to the LSMFT jingle (Low [rf] Space Means Fine Teletype). Now the RF is converted to an intermediate (IF) frequency and then to audio frequencies. This process inverts the high/low relationship to where the Mark audio frequency is lower than the Space audio frequency.

At this point we start talking about "tones" or the actual audio frequencies we are using to drive the terminal unit or demodulator. For many years, the "standard" audio tones for RTTY were 2125 Hz for Mark tone and 2975 Hz for a wide shift (850 Hz) Space tone. It is said these relatively high audio frequencies were chosen because the audio harmonics of these tones fell outside the normal passband of communications receivers of that era thus simplifying the design of the Teletype converters, as they were called. This standard was firmly fixed in iron with the advent of the AN/FGC-1 Teletype terminal designed by the Bell System and manufactured by Western Electric Co. during World War II.

(cont. pg. 8)

(CONNECTIONS cont. from pg. 7)
After the war, RTTY operators soon converted to narrow shift 170 Hz operation for two reasons; it conserved radio spectrum space and it reduced multipath fading of a single tone. This change to narrow shift had an additional advantage, because better and narrower filters were required to adequately separate the now close-together tones, and thus much less noise passed through to affect the demodulator circuits.

The change from wide to narrow shift changed the frequency of only the Space tone and now the standard became Mark tone of 2125 plus 170 Hz or 2295 for the Space tone. Thus we speak of a low tone and a high tone (note the singular) group. Now what about high tones and low tones (note the plural)? This means we are speaking of tone "groups" or "pairs" and actually means that a tone pair (consisting of both a Mark and a Space tone) may be at the high frequency end of the audio bandpass of the receiver as discussed above, or at some lower portion of the audio spectrum, commonly around 1200 Hz or so.

Now why would a low tone pair be required? Lets go back to Donald Duck (TM Walt Disney Inc.) time when both Single Sideband (SSB) and narrow IF bandpass filters became popular. In those days, radios did not have a Frequency Shift Keying (FSK) or RTTY position for the mode switch. So, unless you added a special Beat Frequency Oscillator (BFO) crystal, you used the Lower Sideband (LSB) mode and tried to tune in the RTTY signal. Oh Oh, can't get a 2295 and especially a 2975 Hz tone out of the radio because the narrow filter cuts the signal out of the bandpass before you can tune far enough off center to get the high tone group. This is because the LSB BFO crystal is not offset far enough (only 1500 Hz for SSB) from the center of the bandpass. But not to worry, just design a terminal unit front end with it's filters tuned to some lower frequency, say 1225 Hz for Mark tone and 1395 Hz for Space tone. Now we can use the LSB mode for RTTY and keep the signal within the passband even with very narrow receiver IF filters . So much for Low tones.

With the advent of Packet Radio and the initial use of Bell System modem standards, narrow shift in these units meant 200 Hz and wide shift meant 1000 Hz. The 200 Hz shift is used for 300-baud High Frequency (HF) communication and the 1 KHz shift is used on Very High Frequencies (VHF). This new shift of 200 Hz is carried over to RTTY and AMTOR modes in some of the new multi-mode units such as the PK-232. Other multi-mode units such as the KAM have programmable shifts and thus can hit exactly 170 Hz shift if desired. Although I have not run extensive tests, I find little if any difference between the PK-232 with 200 Hz- spaced filters and my homebrew ST-6 demodulator with narrow 170 Hz-spaced audio filters when it comes to copying weak signals.

Note that both high and low tone-pairs may still be applicable in Packet Radio operations. For example, the HAL RPC-2000 packet board for computer installation lists the availability of two tone-pairs for HF packet operation: 2225/2025 Hz and 1275/1075 Hz allowing use for both FSK mode receivers that used the proper RTTY offset and the receivers that must be used in the LSB mode for FSK operation.

That does it for the May/June issue so until July/August issue very 73. **de Cole W6OXP**

PLAQUE WINNERS

WORLD SINGLE OPERATOR
VE1ASJ
Donor: Advanced Electronic Equipment (A.E.A.)

WORLD MULTI- OPERATOR
HD8CQ
Donor: Advanced Electronic Equipment (A.E.A.)

TOP SCORE NORTH AMERICA
W3FV
Donor: HAL Communications Inc.

TOP SCORE SOUTH AMERICA
HK1LDG
Donor: Association DX-EX

TOP SCORE ASIA
4X6MH
Donor: Don Busick K5AAD

TOP SCORE EUROPE
IK5CKL
Donor: HAL Communications Inc.

TOP SCORE OCEANIA
KL7LF/KH3
Donor: The RTTY Journal

TOP SCORE AFRICA
TR8JLD
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THE CASE FOR AMTOR

Paul Newland, ad7i
ARRL Technical Advisor
Post Office Box 205
Holmdel, New Jersey 07733

INTRODUCTION

AMTOR shares several similarities with conventional BAUDOT RTTY but it also has some distinct advantages. It's similar to BAUDOT in that they both use the same low speed modems (170 Hz shift, commonly 2125/2295 Hz tones) and both provide the user with about the same character speed (60 to 100 WPM for BAUDOT versus 66 WPM for AMTOR). Yet, despite these similarities, there are some significant differences between BAUDOT and AMTOR. On the positive side for BAUDOT, because it uses a simple start/stop transmission format, a mechanical teleprinter or simple computer is all that's needed to print the information that's received by the demodulator. With AMTOR, because it's a synchronous system that has tight timing constraints, a computerized data controller (I call it a "code converter") is needed to meet the real-time protocol requirements. With this as introductory material, the remainder of this article will outline some of the benefits of AMTOR when compared to BAUDOT.

THE AMTOR ADVANTAGE

Many people tend to think that the only advantage of AMTOR over BAUDOT is error reduction. While this certainly is an advantage it isn't the only advantage and, for some users, it may not be the most important advantage. Let's now talk about the advantages for each of the two major AMTOR modes.

FEC (Mode-B)

An AMTOR mode that's most similar to BAUDOT is the AMTOR FEC mode (or Collective Mode-B). This mode is similar to BAUDOT in that the transmitter is on continuously throughout the transmission. However, that's about its only likeness to BAUDOT. FEC mode may be used to send data to one or more stations at a time, such as during regular QSOs, nets or contest operation. FEC features build-in auto-start that isn't faked-out by other signals. That means that CW, BAUDOT, ASCII, PACKET or plain old carriers on your auto-start channel won't cause your terminal to print junk. Another advantage of FEC is that the character error rate will be about 1/10 that of a BAUDOT system. That's because each user character is transmitted twice, allowing the receiver to choose the best of the two received characters. This "replication" coding is VERY effective on the lower frequency bands where the bit error rate is often worse than 1 error per 100 bits transmitted. Another advantage of FEC is that it never sends continuous mark or continuous space signals, even when the sending operator isn't typing at the terminal. This diddle-like operation ensures accurate clock synchronization and allows the ATC circuits in your demodulator to remain charged. Most AMTOR code converters also provide LED status indicators so that the operator can tell if the incoming data represents traffic, idle or error conditions.

How good is FEC? Well, consider the company it keeps. Almost all maritime HF teleprinter broadcasts use only FEC for their transmissions. For example, as part of its plan to phase out CW broadcasts, the U. S. Coast Guard has begun construction of a system of transmitters on 518 kHz (just below the standard AM broadcast band) that will broadcast information to ships at sea using FEC. Transmitters at Cape Cod, Norfolk, Miami, San Juan and New Orleans are already operational; additional transmitters for Pacific areas are scheduled to come on-line soon. Similar broadcasts are made by other nations around the world. A system is also being considered for the HF bands. If you have an all-band receiver take a listen on 518 kHz for a few hours and see what's there. (See Packet column this issue)

ARQ (Mode-A)

The most common mode of AMTOR is ARQ (Mode-A). This is the mode that some say beats your TX relay to a pulp as it sends and receives one data block every 450 milliseconds. Some operators object to ARQ because of the TX relay pounding but I argue that it's just normal wear and tear. All a serious ARQ operator needs to do is burnish the relay contacts when needed and maybe change the relay once or twice during the normal life of the radio. It's just not that big of a deal; think about it as if you were working full break-in CW. Those that use true QSK radios don't even need to worry about the relay wear and tear, QSK gear is designed with constant TX switching in mind.

ARQ provides some significant advantages over conventional RTTY and even AMTOR FEC. First off, error control is almost perfect when using ARQ. Additionally, because every data block is acknowledged by the receiving station, you KNOW your message was received correctly, even if the operator isn't there to tell you so.

(cont. pg. 10)

(CASE FOR AMTOR cont. from pg. 9)
BAUDOT auto-start, even with WRU/answer-backs, can't tell you if your message took some hits. With AMTOR ARQ, you know there were no hits because the system will almost always correct them.

The second advantage of ARQ is that it provides link diagnostics. When through-put slows down because of repeats, AMTOR ARQ allows you to learn which station is having the problem. This is done via the LED status indicators on the code converter. Most code converters provide ERR (error), RQR (request repeat), IDL (idle) and TFC (traffic) status indicators that are updated after every block of data is received from the other station (i.e., every 450 ms). IDL or TFC indications show that both stations are receiving good blocks. An ERR indication means that you just received a bad block while a RQR indication means that the other station just received a bad block from you. This information is great for trouble-shooting propagation or equipment problems. This information can also be used for transmit power control. Since you can tell if the other station is getting bad blocks from you, and you know that almost immediately (within 450 ms), you can reduce power until your RQR lamp flashes occasionally (i.e., the other station is getting errors so it asks you for a repeat) then increase power slightly. This ensures that you are operating with the minimum power needed. With this lower power level you will be less likely to cause interference to other stations. If other stations cause interference to your signals or propagation suddenly gets worse, the RQR LED will light. That's your cue to increase power again to normal levels.

The third advantage for ARQ is its ability to support conversational communications. Because the two stations are locked in synchronism, changing from information sender to information receiver is quick and easy. To make the change, the operator of the information sending station enters +? on the keyboard; the code converters do the rest. Another conversational aid is that the information receiver can break in on the information sender at any time, if necessary for an important comment, by giving a change command (PK-232 ACHG command). You can't do that with conventional RTTY! The ability for simple and rapid change of sending/receiving functions coupled with the break-in feature makes ARQ really shine for person-to-person communications.

AMTOR OPs

So, with all these advantages going for AMTOR, how come more BBSs don't offer the AMTOR mode? AMTOR certainly is capable of working on BBSs. If you don't think so, take a listen to the HF marine teleprinter bands. After a little observation, you will see that ship-board operators rarely communicate with an operator at the shore station. Instead, they are using AMTOR (marine stations call it SITOR) to interact with the shore station's computer to retrieve messages from, or leave messages to, land parties. Some will even "talk- though" the shore station and be directly connected to their home office via the international TELEX network. Neat stuff! No reason hams couldn't have BBSs for AMTOR in addition to BAUDOT (also no reason that the same BBS that supports BAUDOT couldn't also support AMTOR on the same channel).

Another area for AMTOR FEC might be in contests. Now, I am no contester so perhaps my comments here are off target. However, I would think that FEC's ability to be received by all stations, while providing error correction capability that can improve copy despite interference and/or noise on the frequency, would be a real advantage. Perhaps, because of these features, AMTOR FEC might prove to be the RTTY mode of choice for contests.

CONCLUSION

With so many of the multi-mode controllers already in the hands of hams, the same box that can do BAUDOT can also do AMTOR. So, if you have AMTOR capability, consider picking up some of its advantages by giving it a try. You might like it! **de Paul, AD7I**
(*ED: Thank you Paul for this fine article on AMTOR*)

QUITO RADIO CLUB with (l. to r) HC1OT, KE7PL, HC1BI, KE7PN

DXing from the Galapagos Islands

by

Betsy D. Townsend KE7PL

P.O. BOX 644
Spokane, Wa. 99210

Lucky DXers get a chance one day at being on the other side of a pileup, to be the rare and elusive DX sought after by the whole screaming world. My shot came last September on a Dxpedition to the Galapagos Islands for the first CQ/RTTY Journal World-Wide RTTY Contest.

My husband Jay, KE7PN, Hal Blegen, WA7EGA and I wanted to do our next RTTY contest from a DX location. Plans were formed to make our first effort from the Galapagos Islands which are situated about 1000 kilometers off the coast of Ecuador.

Our flight from Spokane, through Miami, and into Guayaquil and Quito, was long and uneventful. Quito rests at 9300 feet in the Andes Mountains. Jay and Hal because of the possibility of altitude sickness had to moderate their intake of fine single malt scotch. Being a female of lessor drinking ability but having more will power this was not a problem for me.

Sunday morning we explored Quito's quiet streets admiring the architecture and the occasional ham antenna. That afternoon Bennie Santos, HC1BI and Peter Katz, HC1OT, drove us around the city, explaining the many historical sites. We finished the day with a visit to the Quito Radio Club. .(see pix pg.10 & 12)

Radio clubs in Ecuador are social gathering places, as well as having fully equipped stations with large antenna farms. They usually have an eating place with a bar, and in the case of Quito's club, a few pool tables as well.

Monday morning we flew into Guayaquil to join Ted Jaramillo, HC5K, Luis Hidalgo, HC2DZ, and Jaime Tamariz, HC5TU for the flight to the islands. We landed in the Galapagos on San Cristobal Island where we were met by our host Guido Rosillo, HC8NGR and Diego Bucheli , HC8VB. We unloaded our gear on the runway from the belly of the Boeing 727, quite an experience.

Galapagos is home for many rare species of animals and birds and is a national park of Ecuador. Among the wildlife found there are the blue and red-footed boobies, frigate birds, Darwin Finches, marine and land iguanas, giant turtles and sea lions. Our contest effort left us with little time for sightseeing, however.

The fourteen mile trek to HD8CQ gave us a good view of the island. The climate changed from hot and humid at sea level to cool and misty on the top where the shack was located. High on a hill, surrounded by salt water on all sides gradually sloping to the ocean, HD8CQ was a DXers dream come true !

The site belongs to Guido and his wife Chela, HC8NGL. Chela was to cook us many great dishes and we ate native the whole time on the island.

Inside the house I noticed these large house spiders. They were black and averaged three or four inches across, with some as big as your fist. Ted quickly pointed out that they were harmless and ate the bad insects . Judging from their size they never went hungry.

We began work on the antennas needed for the contest. At times I could be found with four or five 35mm cameras around my neck taking pictures for everyone. In the thick red mud we worked and it was a real frustrating experience. There were no towers, only pipes and wood poles to support the beams. Holes were dug in the ground with a machete.

The only antennas up when we arrived were a 5 element 10 meter monobander, and a loop for 40 and 80 meters. The 10 meter beam needed work but soon we were on the air on 10 meter sideband. The pileups were tremendous and I got to see what it was like at the other end. I would never have guessed how easy it was to pick out calls. CW was to be another thing entirely, with the QRM tiring out the operators. Hal valiantly fought the pileups to squeeze out QSOs.

Tuesday morning we worked on the Hygain 5 element monobanders for 15 and 20 meters. Antenna construction was performed in the drizzle and mud which probably contributed at least 2 DB gain!

The rest of our crew arrived on Wednesday: Gunter Chanange, HC2CG, Gustavo Falconi, HC2FG and Roy Gould, KT1N.

(cont. pg. 12)

(GALAPAGOS DXING cont. from pg. 11)
We erected the 20 and 15 meter antennas and assembled the Cushcraft 2 element 40 meter beam, preparing it for installation the next day.

We attempted to raise the 40 meter beam on Thursday. The rain had finally quit and almost everyone was there to help while Ted climbed the ladder. Standing at the top of the ladder on one foot, Ted wrestled with the beam. After the beam was about 25 feet up it got too windy to work safely so Ted bolted the yagi to the pole and we would finish it the next day.

We rose early on Friday, the day of the contest, to finish the 40 meter beam. That afternoon we had a solemn ceremony in Spanish with all the local dignitaries of the islands: the Bishop, the Governor of the Galapagos, the Commander of the 2nd Naval Area of Ecuador, the General Manager of INGALA and the local radio club members. We were presented with membership in the Galapagos DX Radio Club.

Our gear for the contest was: two ICOM 751s brought down by Hal and Jay, a Drake TONO, a Commodore C64, Drake L7 amplifiers and AEA CP100 and PK64 TUs provided by Advanced Electronic Applications, Inc. Our class was multi-operator, single transmitter. HD8CQ's operators were: KE7PN, WA7EGA, KT1N, HC5K and KE7PL.

The contest began at 0000 Zulu and from that moment we would only operate RTTY. One hour into the contest we had 45 contacts. Power problems caused logging computer failure, but as we were keeping a hard copy printout we were able to save the contacts.

One of our problems was getting operators to rest so we would have fresh ones. Everyone was excited and no one wanted to go to bed! Jay and I went to sleep at 2145 to get up at 0300 for the next shift.

At 0600 Saturday morning it was time to switch from the generator to the power line. The generator was necessary because the island power system went down nightly from midnight to 0600. A problem in switching over took down the logging computer once again.

Grounding problems were a major source of irritation. When we poured water over the rapidly drying dirt the system improved, so occasional water sprinklings were in order.

After dinner Jay and I walked down the hill a bit to view the night sky. The perpetual fog and mist had lifted and the Milky Way was a glorious sight as it stretched across the heavens from horizon to horizon. Star lanes and clusters were clearly visible to the naked eye. It was my first view of the Southern sky.

On Sunday we picked up some good multipliers and the last four hours were very busy with our rate men Jay and Hal banging the keys to victory. The gun went off at 0000 zulu signaling the end of a successful contest and the start of packing. After group pictures we hurriedly dismantled the equipment, leaving behind only the antennas.

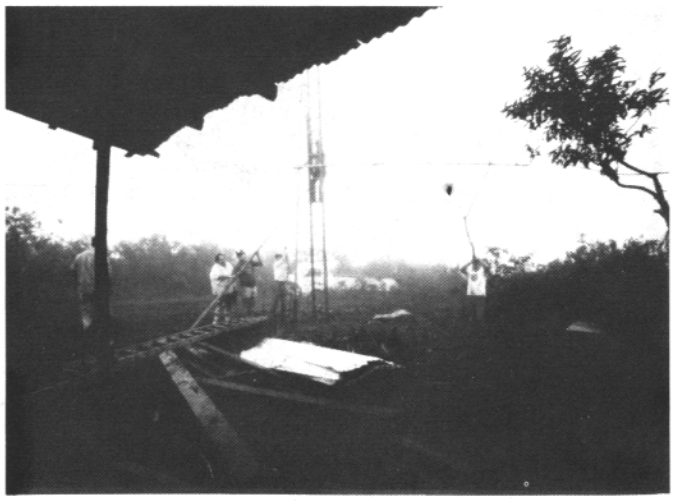
On Monday we boarded our plane for the mainland and Guayaquil. Gunter drove us around for sightseeing and shopping before steak dinner at the Guayaquil Radio Club. To end the evening we went out for a late meal of crabs.

The next morning we left Ecuador for the States. We arrived home one day late due to an unexpected stop in Panama, tired but very satisfied. All of the gear had arrived safely and we felt good about our effort. Most importantly, we had a great time doing it.

Our final score was 1,447,087 with 1,222 QSO's made on all bands, 160-10 meters. We were helped by a good opening on 10 meters to Europe.

Before the contest we worked over 6,000 QSO's on sideband and CW. These contacts were made barefoot during antenna construction with only one operator at a time pulled away from antenna work.

Once the DX bug has bitten, who knows where it will lead you next? **de Betsy, KE7PL**



HC5K climbing ladder to hoist the 20 M. beam while crew braces homebrew scaffle

18th S.A.R.T.G. WORLD WIDE RTTY CONTEST 1988

The Scandinavian Amateur Radio Teleprinter Group invites us all to participate in their 18th annual World/Wide RTTY Contest. Good luck.

RULES

TEST PERIODS:
1. 0000-0800 UTC Saturday Aug. 20
2. 1600-2400 UTC Saturday Aug 20
3. 0800-1600 UTC Sunday Aug 21

BANDS: 3.5 - 7 - 14 - 21 - 28 Mhz

CLASSES:
A. Single Operator
B. Multi-op, single transmitter

Note: Logs from Multi-op stations must contain the names or callsign of all operators involved.

C. SWL stations

MESSAGE: RST and QSO number, (three figure group starting with 001)

POINTS: QSO with own country, five (5) points; other countries in same continent, ten (10) points: other continents fifteen (15) points. In USE, Canada and Australia each call district will be considered as a separate country. The same station may be worked once on each band for QSO and multiplier credits. Only 2-way RTTY QSO's will count.

MULTIPLIERS: Use the DXCC list and each district in W/K, VE/VO and VK.

Note: Contact with a station which would count as a multiplier, must be found in at least 5 logs, or contest-log from the multiplier station must be received in order to be valid.

SCORE: Sum of QSO points X sum of multipliers

SWL STATIONS: Use the same rules for scoring, but based on stations and messages copied

LOGS: Logs must be received by October 10, 1988. The logs to contain, Band, Date, UTC time, Callsign, Message sent and received, Points and Multipliers. Use a separate sheet for each band and enclose a summary sheet showing the scoring, class, callsign, name and address. In case of Multi-operator station, the name or callsign of all operators involved. Comments will be very much appreciated.

Send Logs To: Contest & Award manager.
OZ1CRL
Jorgen Dudahl-Lasjon
Egebjergvej 90
DK 4500 Nykobing Sj.
Denmark

AWARDS: To the top stations in each class, country, W/K, VE/VO and VK call district, if the number of QSO's is reasonable.

HAMCON 88

THE MAGIC OF AMATEUR RADIO
PUBLIC SERVICE • INTERNATIONAL GOODWILL

ARRL SOUTHWESTERN DIVISION CONVENTION

September 2, 3, & 4, 1988

at the Disneyland Hotel in Anaheim, California

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_____ Ladies Luncheon @ $10.00 ea. _____
_____ Sunday Breakfast @ $10.00 ea. _____

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Richard E. Polivka
N6NKO
18943 Vickie Ave. #34
Cerritos, CA. 90701

PACKET

CONTEST

Well, I hope that after last month's article, you have gotten the contesting bug and might pursue one of the more challenging aspects of Amateur Radio. There are many contests running all of the time and they are always listed in this publication.

THE BEGINNER'S CORNER

Well, I think that I managed to get the cart ahead of the horse last month by discussing how to send mail before reading what is already there. So, I will make up for lost time by going over the READ function.

There has to be a way for each BBS to keep track of all of the messages that the systems accumulate. What they do is assign a message number to each message so the system can keep track of them. You recall the messages by telling the system to READ a particular serial numbered message. The command to perform that is accessed by using either **'R'** or **'READ'**. After the command you type the serial number of the message that you want to read. The command also has a couple of options that are quite beneficial for the user. One of the options is to read all of the messages sent to a particular destination. For instance, if you want to read all of the messages sent to **'ALL'**, you would use the command **'R > ALL'**. The '>' tells the system to look for any message with a destination matching what is after the sign. You can also do the opposite and read the messages from a particular source by using the '<' sign. So, if I wanted to read all of the traffic from N6NKO, I would type **'R < N6NKO'**.

That basically covers the READ function. There is another function available that uses the same constructs but acts differently. It is the **'LIST'** function. It prints out all of the message headers that are specified without printing the text of the message. To list all of the traffic to 'ALL', you would type **'L > ALL'** and to list the traffic from a source, you would type **'L < (call)'**.

This covers the basic READ, LIST, and SEND functions of a BBS. Next month, we will get into forwarding of traffic between BBS's.

NEW RELEASE

I received a letter from the good folks at AEA the other day. They have announced a new update to the firmware package for the PK-232. The biggest addition to the firmware this time is the NAVTEX mode. With this mode you will be able to listen in on the NAVigational TELEX transmissions that will be on 518 KHz. The system will be able to keep track of the messages received and not re-display one that it has already been received unless there were many errors. That is just one of the more interesting modifications made by them. Registered PK-232 owners will be getting a brochure in the mail explaining the rest of the functions and the costs involved. I will be getting the software update and I will report to you my opinions and I am also soliciting opinions from other PK-232 users on how they like the update.

CHASTISEMENT

I have been hearing complaints that Packet users have been leaving the channellized subbands on the lowbands and setting up shop on other frequencies. Comments to the effect that it is too crowded and takes too long to send traffic have been received. What is amazing is that I do not hear that from the users of RTTY and AMTOR. I think what is happening is that people are beginning to realize that in order to get traffic across error-free, there is going to have to be some compromise. There are a few channels available to Packet users on the lowbands and they will have to suffice for everyone until the bands open up and the paths get more reliable. Then we will be able to pass more traffic faster and with less retries. So, let's stay where we should be and be at peace with everyone else.

PACKET DX!

Finally, the Packet community is going to get some RARE DX! The DXpedition leaders have secured rights from the ITU to operate, next year, from "Know Nothing Atoll" in the West Pacific. The callsign to be used for the DXpedition will be J0KE and the operators there will be the famous operator RG8U and his associate, 5Y3GT. The QSL manager for this operation shall be RG8U's dad, RG8AU. So, look for them on whatever bands they can get on (it depends on the size of the island at the time of transmitting). They will try to get on 20 meters and 10 meters. The date for this operation will be April 1, 1989 so Happy DX!
Until next month 73. **de Richard, N6NKO**

FIRST ANNUAL CQ/ RTTY Journal WORLD WIDE 1987 RTTY DX CONTEST

By Roy Gould, KT1N

Well, I just can't get over the level of participation in the first CQWW/RTTY Journal RTTY DX Contest. Let me give you some history on how this came about. Having been active for many a year and being away from the mixed honor roll and finding them harder to find, I became interested in RTTY. Now, everyone knows that no one on RTTY can type so I thought I'd fit right in, a real natural, and no one would notice. Before I knew it, I found myself chasing DX on the keys. It was fun and I discovered a whole new group of friends. During this time, the RTTY Journal ran an annual RTTY contest. The contest was good but it needed some work. A group of us talked about it and thought it would be great if CQ would co-sponsor the contest, after all, we all know they run the best contests in the world, right?

One thing led to another and before I knew it I was editing the DX Column for the RTTY Journal. I usually make the trip to Dayton and I found myself chatting with the gang from CQ about RTTY and Contests. On one of these visits, I discovered that Dale W6IWO was the new owner of the RTTY Journal. In the intermin, I had been talking to Alan and Dick at CQ about the contest, and now with Dale on the scene we soon found ourselves with the First CQ/WW RTTY DX Contest, co-sponsored by the RTTY Journal. After a number of passes at the rules and the help and suggestions of many we were on our way and what better time to hold the CQ/WW RTTY than the last full weekend in September, followed by the Phone and CW contests.

I was a bit skeptical about the first one. I couldn't help but wonder about the level of activity, would the boys from Europe and Asia get into it? etc. Then the weekend came and WOW! What activity. I was part of the group that went to the Galapagos as HD8CQ, and I could not believe my ears, or should I say my screen. The level of activity was fantastic and I can only envision this contest growing and growing. A great many of you have sent notes with your logs with suggestions and ideas. I plan to print many of them in the soap box and some we'll incorporate with a revision of the rules. But lets get to the results, I will outline those changes later.

SCORING AND LOGS

Many of you will find that your score has changed from the original log you sent in and in most cases it has gone up! The biggest confusion, was wether or not the USA and Canada count as country multipliers.

The answer is YES. The rules state that the ARRL DXCC and WAE lists will be used, and of course the USA and Canada count on those lists. I realize now, after many hours of changing scores, that I should have clarified that point. So for future reference, remember they count! For those that didn't take the credit, I added it. Many logs came through with out summary sheets, pages not totaled, US and VE contacts with no state or province logged, etc. This time we'll overlook most of these errors, this being the first contest and understanding that the rules may not have received the widest coverage. I spent a considerable amount of time getting the logs in the kind of shape that was needed to do this report. As I stated earlier, this time OK, but next time PLEASE summary sheets and complete logs. Follow the rules.

Nearly 300 logs were received for this inaugural RTTY contest and I am sure it is going to be THE RTTY CONTEST, so with everyones help with clean, complete logs we can get the results back to you as soon as possible.

ALL BANDS

Andy VE1ASJ put in a fantastic effort to win the world with a score of 306,075 points and a QSO total of 489. Not far behind was Raul HK1LDG, with 503 QSO's and a total of 297,400. Interesting that Andy's QSO's with the US were 2 pointers but he made up for it with more country multipliers, 103 for Andy to Raul's 76. Taking 3rd place was IK5CKL Piero, with 265,640 points and 454 QSO's. First USA was Barry W3FV, with 258,000 points for 4th place World Wide, and Barry missed the first 5 hours of the contest but still put in almost 30 hours. He was followed closely by W2FG Ted, with 251,196 in 5th place.

SINGLE BANDS

There were a number of single band entries for almost all the bands, but of course 20 meters brought the most. 1st place in the world on 20 goes to 8R1RPN with 393 QSO's and 64 countries. A battle took place for 2nd and 3rd with Dan NB2P, taking the No.2 spot with 125,184 and George W1DA locking in 3rd with 119,865 points. The other bands had a scattering of entries, however some good efforts by CE6EZ on 10 meters with 116 QSO's and CT4UE with 154 QSO's and 36 countries on 40 meters. **(cont. pg. 16)**

(CQMAG cont. from pg. 15)

MULTI- OPERATOR

The biggest and overall high score for the contest goes to HD8CQ from the Galapagos. 1,222 QSO's on all bands with 150 countries for a total score of 1,447,087!! This group was made up of myself and three other RTTY DXers from the states along with a group from Ecuador and the island of San Cristobal in the Galapagos. The operating site was from a hill top at 1800 feet above sea level. It was a pleasure to operate from and to watch the action in this First CQWW RTTY contest. The gauntlet was thrown and John TG9VT picked it up and tried a multi from his QTH with W2JGR and others, but the additional point that the HD8 gang received for each US and Canadian QSO was too much to overcome. TG9VT came in with 591,838 points for 2nd place. Not far behind came LZ1KDP with 513,280. The gang from there always puts in a good effort and made 651 QSO's. 4th place goes to a great effort by ED1BM with 352,347 with 570 QSO's, brought up by KA3GIK in the State of Pennsylvania with 260,463 with 456 QSO's. They are a husband and wife team, Elizabeth and Pat WB3FIZ, and active in all the RTTY contests..

CHANGES in the RULES

The rules will stay basically the same except for the following:

1. We are going to delete the 160 Meter Band.

2. Dupe sheets for each band only when the contacts are over 50 for that band. The complete rules will either be in this issue or the following depending on space.

SUMMARY

Thank you all for your support and comments. All certificates are in the mail for the winners, and also to all entrants as everyone who sent in a log will receive a certificate of participation. Hope to see all of you in September. Mark the dates 24 and 25 of September.

CQ/RTTY Contest Chatter de USA

Best feature of test, was it took Hal WA7EGA and Roy KT1N out of town to HD8CQ, gave us a chance hi hi....KB2V0/4. Now I know what a sardine feels like after operating between 14.080 and 14.100....KD6PY. Lets do it again next year!!...W8JAQ. I have been in many RTTY contests but there were many more contacts in this as any other, enjoyed repeated runs on many bands...K6WZ. Great contest, really enjoyed it...AB0Y/4. Biggest surprise was CE0ZIJ upside down even...WA3ZKZ. how about a power multiplier for 100 watts or less?...WA4DYD. Regular CQWW not suited for this test, and how about dupe sheets for 100 QSO's or more?...W6BSY. Twice the number of QSO's than any previous RTTY Contest...W2FG. Lots of activity for an inaugural contest, new ones 8R1, CP, and 4U1UN...K0BJ. One of the operators at HD8CQ said he was glad it was almost over as they were out of Scotch!..W6IWO. First contest entered, the exchange is great! 1 buffer... WA6PJR. Where were KH6 and KL7? lots of fun see you next year...WB6WQA. XYL broke ankle, with her needing attention my rest periods look liked operating periods and vice versa see you next year...W4UW. Lots of good activity for 1st one, KH3 and HC8 were good catches, Good Luck...N8BJQ. Super contest, forgot to monitor my time and had to subtract last 3 hours of operating! GROAN...N6GG. Could only spend a few hours but worked 5 new ones...AA2Z/1. Glad to have contributed...N7RY Congrats on a Super contest...KA7IVA. Lets make the rules for this the same as CW and Phone...W2KHQ. Our first experience at a RTTY contest and for most of us RTTY, how about a Multi-Multi?...the ops at N8ABW. Worked an LZ who loved my call, his name was IVO...WB2IVO. I still hear "chirping" in my sleep!...KD8NJ. First contest in 10 years!...W6OXP. Excellent participation, sorry I missed first 5 hours...W3FV. Worked 6 new countries...N2WK. Sorry we didn't hit it harder, but got discouraged by band condx here in the Pacific Northwest...NG7P. Good Luck, I had a great time...WA8FLF. The contest was great and long due, fast paced and competitive...NJ0M. Nice to work 40 countries in 2 days on RTTY!!...AB9O. This has got to be the PREMIER RTTY contest, right combo of multipliers and exchange...W1DA. Worked WAC in 62 QSO's..W6CN. You must have shooked the trees for this one, so many stations!...K2PEQ. 3 hour off time is to long, how about 1 or 2?...WF5E.

MORE CQ/RTTY Contest Chatter de DX

Keep up the good work CQ with yet another winner ... ZL1BIL. Why not call it Digital Contest to encourage Amtor etc?...VU2IJ. Good participation, poor propagation...IS0VME. Got a new one...JA8RUZ. ... HI8DLA. Still got this numb feeling in my fingers.Got a new one...JA8RUZ. Tough one with cheap interface... .HI8DLA. Still got this numb feeling in my fingers. OH2LU. I cannot find meaning of "dupe" sheet in my dictionary, hope log is ok...PA0YN. I am going to get CQ again just to keep up with rules and results of this one!

(cont. pg. 17)

(CQMAG cont. from pg. 16)
Good going guys, what interest!!...73, Andy VE1ASJ. I am a CW man since 1950, but this was pleasure to work...HB0/HB9NL. Good Condx, lots of activity, see you next year from GD...G4SKA. Don't forget to look for VE RTTY above 7.100...VE3UR. How about 0 points for own, 1 for same continent, and 3 for DX?...DJ6QT. Great to work Jean F8XT after many years, good contest...VE7YB. Looking for 88 test!!...EA5FKI. Thanks Yanks, had a pile up on me on 15 and 20..unheard of!! Promise you'll do it again next year?...G0ATX. Difficult being rare DX, lost 5 for everyone worked, lots of QRM...J88BN. Where were all the AX.25 stations?...G0AGH. No time for all bands, maybe next year...I2VXJ. Come on guys, give 10 Meters a try...CE6EZ. Tnx for the contest...ZL2AKI. Rules are to loaded in favor of USA and Europe...ops at VU40JX. Good activity, poor timing, same as SAC Phone...SM5FUG. Biggest thrill was pulling HL1IE out of the noise 6 minutes before the end...TG9VT. 48 hours is long time for RTTY test, say 24 hours?...ops at UZ6AWF. Several times during the contest we stopped to run outside into the mud to witness one of the brief appearances of the Sun, someone said they took a photo...ops at HD8CQ. Have never worked that many Americans in one contest!...PA3DBS. 1st RTTY contest, not sure I can do it again with this type of equipment...9Q5NW. Lots of activity as usual in all CQ contests...CS7NH. Boy! this is a lot tougher then phone or CW...VE6CB/3. I was amazed at the signal strength of HD8CQ and TG9VT on 40 Meters...JA1WVK. Nice contest, see you next year...4X6MH. At the end of the contest, I discovered I could use my CW filter for RTTY!!...HC1BI. A New STAR is born! Great Fun....TR8JLD.

STATION OPERATORS MULTI-OP

KA3GIK & WB3FIZ, NG7P & K9VFY, N8ABW & K8AQM, KA8POW, KB8BVW and K8INX, KL7PG & WL7AWJ, ED1BM: EA1AVN, EA1DWI, EA1PJ and EA1CIM, LA3T: LA2KGA, LA7ECA, LA7SP and LA7QM, LZ1KDP: LZ1IU AND LZ2UU, OK3KII: OK3CDV, OK3CNJ, TG9VT & W2JGR/TG9, TG9AWS/KQ6U, UZ6AWF: UA6CQ, UA6AX, UA6AZ, UZ9CWA: UA9CG, UA9CR, UW9CT, UA9CFV and UA9CGA, VU40JX: VU2JX, VU2NTA, VU2LBW, YU7KMN & Mijic Zlatko, 4U1UN: NA2K & NA2J, HD8CQ: HC2CG, HC2DZ, HC2FG, HC5K, HC5T, HC8GR, HC8VB, KE7PN, KE7PL, WA7EGA and KT1N.

de Roy, KT1N

1987 CQ/RTTY JOURNAL WW RTTY CONTEST

TOP SCORES WORLD ALL BAND

VE1ASJ	306,075
HK1LDG	297,400
IK5CKL	265,640
W3FV	258,000
W2FG	251,196
OK2FD	247,470
HB9BNP	232,624
TR8JLD	219,657
ZV2BW	192,558
CS7NH	148,680

TOP SCORES USA ALL BAND

W3FV	258,000
W2FG	251,196
WB5HBR	125,545
N6GG	99,470
K6WZ/0	71,442

TOP SCORES CANADA ALL BAND

VE1ASJ	306,075
VE6CB/3	95,360
VE6ZX	52,670
VE7YB	16,050
VE2JR	11,160

TOP SCORES MULTI-OP

HD8CQ	1,447,065
TG9VT	591,838
LZ1KDP	513,280
ED1BM	352,347
KA3GIK	260,463

TOP SCORES WORLD 14 MHZ

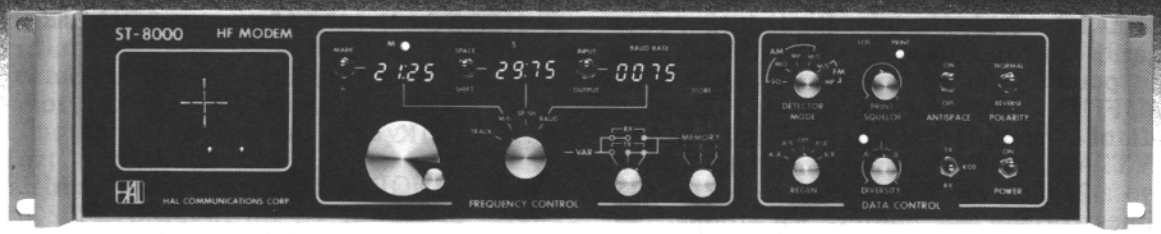
8R1RPN	148,224
NB2P	125,184
W1DA	119,865
CX7BY	96,945
4X6MH	96,726

PLAQUE WINNERS ON PAGE 8 THIS ISSUE

Stu, WA2MOE (third from left) takes time out for lunch with some of the L. A. gang. Stu was taking a one day cram course in RTTY with a TONO at Irv's ,W6GC's home. (l. to r.) W6GC, Irv..W6PQS,Don.. Stu Green, WA2MOE..WA6PJR, Dean..WK6E, John.. W6ATC, Harry (past pres. national QCWA).. K6EV, Ed.. Picture by W6IWO, Dale.. Stu left the next day for Kingman and Palmyra, maybe you worked him from one or the other.

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

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



ST-8000 HF Modem

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

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

Write or call for complete ST-8000 specifications.

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Government Products Division
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(217) 367-7373 TWX 910-245-0784

RESULTS CQ MAG/RTTY JOURNAL WW RTTY CONTEST - SEP 1987

Number groups after call letters denote following:
Band (A = all), Final Score, Number of QSO's,
Zones, Countries and State/Canadian Provinces.

SINGLE OPERATOR
NORTH AMERICA UNITED STATES

Call		Score	QSO's	Zones	Ctrys	US/VE
W1AX	A	32,370	102	40	70	20
AA2Z/1	"	12,963	94	20	26	41
KT1O	"	4,704	37	20	27	9
N1DGC	"	551	9	8	10	1
W1DA	14	119,865	431	25	61	45
KA1MP	"	7,965	66	14	27	18
W1GQR	"	6,419	60	11	24	14
WB1AQA	"	6	1	1	1	0
W2FG	A	251,196	462	60	115	67
NQ2O	"	42,504	136	41	68	45
NO2T	"	37,224	137	33	56	43
W2KHQ	"	30,000	106	39	60	26
N2WK	"	26,691	101	34	59	30
WB2IVO	"	16,212	93	27	40	17
W2AYJ	"	11,461	61	20	45	8
NA2K	"	3,280	28	15	25	0
W2PHT	"	943	14	11	12	0
W2FCR	21	7,242	52	17	32	3
NB2P	14	125,184	422	25	67	36
KC2FD	"	17,479	110	17	37	23
KJ2N	"	4,784	41	12	27	7
W3FV	A	258.000	412	60	111	69
N3UN	"	38,760	122	43	66	27
WA3ZKZ	"	14,900	76	29	42	29
KC3ST	3.5	304	15	3	3	13
ABOY/4	A	67,184	272	19	79	38
KB2VO/4	"	67,080	285	29	65	35
K8UNP/4	"	37,628	128	35	56	23
W0YVA/4	"	16,928	80	28	46	18
KI4MI	"	16,402	122	30	44	44
W4UW	"	13,857	64	32	44	17
WA4DYD	"	2,944	35	21	10	15
K4JYS	14	34,974	177	21	43	23
KD4DM	"	5,040	44	12	24	9
K2PEQ/4	"	2,014	22	12	21	5
K7HCP/4	"	891	16	10	11	6
NU4N	"	598	14	8	7	8
WB5HBR	A	125,545	374	48	72	91
KF5YE	"	51,460	171	44	66	45
W5HEZ	"	36,703	127	41	60	26
KA5CQJ	"	35,154	109	40	63	23
KA5YSY	"	12,298	65	28	39	19
KA5LGP	"	837	19	9	9	9
NN5T	"	12,382	88	27	30	25
N5HB	"	11,074	59	44	35	19
WF5E	14	39,000	222	23	44	37
KE9EQ/5	"	26,690	203	19	31	35
N6GG	A	99,470	269	51	76	76
K6EID	"	79,002	207	53	79	77
W6IWO	"	39,543	182	37	42	68
WA0QII/6	"	33,976	157	35	46	43
W6JOX	"	33,060	150	38	42	65
WB6WQA	"	21,056	107	31	38	43
W6BSY	"	11,592	73	31	32	29
W6ZH	"	11,562	75	28	32	34
W6OXP	"	9,047	61	26	30	27
WA6PJR	"	6,300	42	23	28	12
KE6T	"	1,440	16	15	16	1
KD6PY	"	726	12	11	11	0
W6CN	14	9,792	77	16	27	25
W6HT	"	1,421	19	12	15	2
N6CBK	"	1,178	29	7	6	18
N7RY	A	50,616	209	35	49	64
KT7H	"	20,332	155	22	25	42
KA7IVA	"	10,530	81	23	28	30
KF7BF	14	17,510	129	22	33	30
AB9O/7	"	16,660	94	21	42	22
W7MI	"	12,996	79	18	39	19
AB7Y	3.5	418	19	5	4	10
AB8K	A	39,905	122	36	69	10
W8JAQ	"	13,846	64	28	48	10
N8BJQ	"	8,748	52	34	28	19
KD8NJ	"	8,249	66	22	27	24
W8LNK	"	7,700	53	23	31	16
WA8FLF	14	5,916	49	14	25	12
KB8ZM	"	1,645	23	8	10	9
WB8SFF	"	525	11	8	10	2
KA9PJZ	A	21,340	83	27	56	14
NE9U	"	16,564	89	32	41	28
W9FFQ	"	1,344	25	10	14	5
K9JNB	"	640	11	9	11	0
K6WZ/0	A	71,442	309	40	49	73
KOBJ	"	55,176	208	44	57	51
KEOY	"	13,685	72	29	49	9
NGOX	"	3,869	39	18	19	16
NJOM	14	75,720	323	25	60	35
KEOKB	"	25,156	160	21	45	27
WOLHS	"	11,088	90	18	30	24
WOHAH	"	8,760	59	15	33	12
NXOI	"	4,300	59	11	15	17
KOFMR	"	828	31	5	5	13

ALASKA

NL7IB	14	4,578	50	10	14	15

CANADA

VE1ASJ	A	306,075	489	59	103	103
VE2JR	"	11,160	62	20	31	21
VE2QO	14	12,376	71	13	38	17
VE6CB/3	A	95,360	235	40	74	46
VE3UR	"	35,722	131	25	46	35
VE6ZX	"	52,670	215	28	30	57
VE7YB	"	16,050	88	21	30	28
VE7BDQ	14	360	12	4	3	8

Call		Score	QSO's	Zones	Ctrys	US/VE
COSTA RICA						
TI2OY	14	47,080	246	15	34	39
DOMINICAN REPUBLIC						
HI8DLA	14	9,240	76	13	19	24
GUATEMALA						
TG9SO	14	17,340	119	17	22	29
MEXICO						
XE2NNZ	A	83,420	235	35	36	101
XE2AQ	14	2,040	46	10	10	0
PANAMA						
HP1AC	14	999	15	13	11	3
PUERTO RICO						
NJ7D/KP4	14	1,375	25	6	9	12
ST. VINCENT						
J88BN	A	48,087	154	36	42	59
AFRICA						
CANARY ISLANDS						
EA8AKQ	A	92,448	215	36	67	41
EA8AZM	14	42	3	2	2	2
GABON						
TR8JLD	A	219,657	344	54	107	58
ZAIRE						
9Q5NW	A	10,836	86	10	32	10
ASIA						
INDIA						
VU2SJV	A	17,308	86	27	52	0
VU2IJ	14	656	15	5	11	0
ISRAEL						
4X6MH	14	96,726	351	22	53	19
JAPAN						
JA1BWA	A	49,228	141	41	63	20
JH1QDB	"	30,870	115	33	48	17
JA1WVK	"	25,443	91	32	51	16

RESULTS CQ MAG/RTTY JOURNAL WW RTTY CONTEST - SEP 1987

continued

Call		Score	QSO's	Zones	Ctrys	US/VE
JA2LA	"	2,590	26	16	21	0
JR1VAY	"	2,294	23	17	18	2
JA8RUZ	"	1,248	17	10	14	2
JA8EAT	7	1,911	35	8	8	5
			KOREA			
HL1IE	14	19,491	100	22	41	10
			MACAO			
XX9DN	A	5,412	57	18	23	0
			U.S.S.R. (ASIATIC)			
			ASIATIC RUSSIA			
UA9FBV	14	13,769	100	13	33	3
			EUROPE			
			AUSTRIA			
OE3HCS	A	6,903	46	25	34	0
			BELGIUM			
ON6ZM	14	8,792	67	15	30	11
			CZECHOSLOVAKIA			
OK2FD	A	247,470	421	52	110	64
OK2BRD	14	92,640	313	23	55	42
OK1DOH	7	153	8	3	6	0
			DENMARK			
OZ7SAC	A	14,430	79	23	40	11
OZ4DZ	"	8,775	59	23	39	3
OZ1LSV	14	3,744	40	6	9	17
			ENGLAND			
G4SKA	A	142,725	323	41	89	43
G4PKP	"	111,390	286	38	77	43
G0ATX	"	57,441	180	28	56	39
G4UZN	"	8,436	66	17	29	11
G0AGH	"	851	18	7	14	2
G4JLU	14	828	15	6	13	4
			FED. REP. OF GERMAN			
DJ6QT	A	19,838	85	32	48	11
DF1GW	"	4,708	42	11	19	14
DJ2YE	"	4,512	38	15	27	6
DK7FP	"	4,171	37	12	18	13

Call		Score	QSO's	Zones	Ctrys	US/VE
			FINLAND			
OH2LU	14	44,253	184	21	54	24
			FRANCE			
F6BVB	A	12,358	68	25	37	12
			GREECE			
SV1UG	A	24,570	130	27	58	6
SV1VF	"	20,328	107	25	53	10
SV1VC	"	20	5	2	2	0
			HUNGARY			
HA5CP	A	53,625	174	66	37	22
HA8XF	"	3,280	37	13	26	1
			ITALY			
IK5CKL	A	265,640	454	56	110	63
I1BAY	"	112,905	245	50	108	35
I2WEG	"	39,376	171	26	68	13
I5MPN	"	32,214	107	39	53	26
I6KYL	"	18,304	83	25	42	21
IV3PVD	"	5,734	39	12	32	3
I0KHP	"	5,670	43	18	23	13
IK0JOZ	"	2,774	33	13	17	8
IV3AVQ	21	14,850	80	19	29	18
I2VXJ	7	14,160	108	16	43	0
			LIECHTENSTEIN			
HB0/HB9NL	A	34,848	149	31	58	32
			NETHERLANDS			
PA3DBS	A	94,375	232	33	66	52
PA0YN	14	1,566	23	9	15	5
			NORWAY			
LA4LM	14	1,012	16	10	10	3
			POLAND			
SP9BCH	A	69,504	227	34	70	24
SP3BGD	14	19,918	72	14	30	13
SP3XR	"	2,812	31	11	21	5
SP9HWN	"	1,508	20	10	16	3
SP2UU/1	"	300	9	5	9	1
SP3CCT	7	1,474	62	6	16	0
SP2FF	"	66	4	3	4	0
SP2UUU/1	3.5	405	13	5	10	0

continued

Call		Score	QSO's	Zones	Ctrys	US/VE
			PORTUGAL			
CS7NH	A	148,680	348	45	89	43
CT1CKP	"	18,960	112	21	49	9
CT4UE	21	32,240	154	17	36	27
CR6AUR	14	48,380	249	16	38	28
CT1BHX	"	24,708	146	14	32	25
CT1BKK	"	2,212	26	7	14	7
			SARDINIA			
IS0VME	14	48,504	229	16	44	26
			SPAIN			
EA5FKI	A	118,440	258	42	90	48
EA3CZM	"	28,050	94	34	49	27
EA3EGI	"	13,440	73	23	42	15
EA3FNI	"	12,300	75	23	44	8
EA3ELD	"	9,975	72	12	33	12
EA3FPT	"	7,755	53	15	30	10
EA3FIM	"	5,472	54	14	31	3
EA1AW	"	2,250	25	11	19	0
EA3EGB	21	3,102	33	9	11	13
EA1YW	"	2,448	26	12	14	8
EA2BUQ	14	7,672	63	10	35	11
			SWEDEN			
SM5FUG	A	25,517	117	22	25	24
SM7BGE	"	10,726	64	20	35	7
SM5APS	"	153	6	4	5	0
SM7AIO	14	1,430	24	8	16	2
SM4JCY	"	465	14	5	10	0
SM4CMG	7	13,122	115	15	35	4
			SWITZERLAND			
HB9BNP	A	232,624	402	54	107	56
HB9DCQ	"	63,510	185	39	85	21
HB9AAA	"	32,340	120	33	54	18
			WALES			
GW0ANA	A	5,684	51	14	30	5
			YUGOSLAVIA			
YU7AM	A	49,407	152	43	63	23
YU3MJ	"	3,735	41	16	29	0
YT2GW	14	59,984	253	17	41	29
			OCEANIA			
			AUSTRALIA			
VK2RM	14	15,360	90	19	41	0
VK2BQS	"	10,416	66	19	34	3

RESULTS CQ MAG/RTTY JOURNAL WW RTTY CONTEST - SEP 1987

Call		Score	QSO's	Zones	Ctrys	US/VE
INDONESIA						
YB5NOF	14	43,758	192	26	48	4
YB5QZ	"	20,223	109	21	38	4
YB1BG	"	8,131	62	17	29	1
JOHNSTON ISLAND						
KL7LF/KH3	A	58,850	158	28	32	47
MARSHALL ISLANDS						
KX6OI	A	54,180	178	40	39	26
NEW ZEALAND						
ZL2AKI	A	17,640	90	24	34	12
ZL1BIL	14	3,600	34	14	18	4
PHLILIPINES						
DU1TV	14	300	9	6	6	0
SOUTH AMERICA						
BRAZIL						
ZV2BW	A	192,558	332	48	95	58
PT7AQ	21	12,265	78	12	24	19
CHILE						
CE4UW	A	28,910	109	27	48	23
CE6EZ	28	23,253	116	16	24	29
CE3BFZ	21	9,540	61	14	22	17
3G2Z	14	32,800	145	22	34	24
COLOMBIA						
HK1LDG	A	297,400	503	42	76	82
HK4BHA	"	15,498	83	42	34	6
HK6HPZ	"	14,350	61	28	28	26
HK4DUM	"	12,416	69	16	11	37
HK4GVD	"	10,974	63	13	24	22
HK4AHX	"	518	20	4	6	4
HK4ETN	"	192	8	5	5	2
HK4HPH	"	140	8	4	4	2
HK4RK	"	99	7	4	4	1
HK4ZM	"	42	3	3	3	1
HK4LRM	"	8	2	2	1	1
HK4FYZ	21	88	7	3	2	2
HK4XYZ	"	28	3	2	2	0
HK4JYE	"	16	3	2	2	0
HK4GFD	14	49	4	3	3	1
HK4KLV	"	42	5	2	2	1
HK4GGF	"	42	3	3	3	1
HK4MZQ	"	15	2	2	2	1
HK4FYY	"	9	1	1	1	0
HK4IES	"	9	2	2	2	1
HK4FTA	"	4	1	1	1	0
COLUMBIA						
HK4LII	7	120	5	4	4	2
HJ4NPX	"	112	9	3	3	2
HK4HQU	"	49	4	3	3	1
HJ4NBX	"	25	2	2	2	1
HJ4MYQ	"	25	3	2	2	1
HJ4NNM	"	25	3	2	2	1
HK4HQT	"	25	3	2	2	1
HK4MDH	"	9	1	1	1	1
HJ4NHS	"	9	1	1	1	1
HK4KAQ	"	9	1	1	1	1
HJ4OGA	"	6	3	1	1	0
HJ4MBO	"	4	2	1	1	0
HK4KNK	"	4	1	1	1	0
ECUADOR						
HC1BP	A	65,065	159	42	51	50
GUYANA						
8R1RPN	14	148,224	393	25	64	39
URUGUAY						
CX7BY	14	96,945	293	24	54	37
VENEZUELA						
YV5KAJ	14	58,104	187	20	56	32
YV5IZE	"	5,586	47	14	25	9
MULTI - OPERATOR						
NORTH AMERICA UNITED STATES						
KA3GIK		260,463	456	56	86	95
NG7P		130,174	194	37	57	100
N8ABW		81,780	239	52	71	51
ALASKA						
KL7PG		9,960	73	17	21	22
U.N. NEW YORK						
4U1UN		61,596	228	31	41	46
GUATEMALA						
TG9VT		591,838	764	66	114	158
ASIA						
JAPAN						
JH7ZZO		28,710	101	32	51	16
INDIA						
VU4OJX		145,863	345	67	85	14
ASIATIC RUSSIA						
UZ9CWA		197,001	387	44	111	22
- **EUROPE**						
BULGARIA						
LZ1KDP		513,280	651	74	176	70
CZECHOSLOVAKIA						
OK3KII		56,889	179	36	77	16
NORWAY						
LA3T		49,608	185	24	53	29
SPAIN						
ED1BM		352,347	570	63	131	63
YUGOSLAVIA						
YU7KMN		103,620	256	38	77	50
EUROPEAN RUSSIA						
UZ6AWF		147,087	352	45	111	21
SOUTH AMERICA						
GALAPAGOS ISLAND						
HD8CQ		1,447,065	1222	84	150	171

CHECK LOGS

Our thanks to the follwing stations who sent in check logs: KJ2N, NM2I, WA9TMU, SM6EZI, SP2UU/1, SP3BGD, UA9FBV, VK5RY, LA7SP and VU2AP.

WIRELESS DATA RECORDER

AR1200

TECHNICAL EXCELLENCE IN DIGITAL COMMUNICATIONS

Mobile packet terminal

SPECIFICATIONS

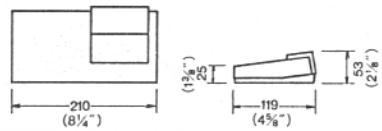
GENERAL

Protocol	AX.25 level 2
Modem	VHF/AFSK
Processor	Z80 Software compatible
Memories	ROM 32K, RAM 32K
Communication speed	1200bps (wireless)
at RS232C terminal	1200bps (300–9600bps rate selective)
Power source	DC–12V +/– 15%
Current drain	700mA average
Operating temperature	0– +40 degree C
Storage temperature	–20– +60 degree C

PRINTER

Printing method	Thermal head
Letter structure	7×5 matrix
Printing space	2 dots
Letter size	2.4×1.1mm Characters/Numerics/Marks
Characters per line	40 characters
Paper	Thermal sensitive only
Paper size	80mm +/– width 40mm diameter of roll

Dimensions:
(mm)



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COMMODORE CUSTOM CHIPS for C64/128 Computer/Peripherals at low prices. 24 hour delivery: #6510 - $9.55, #6526 - $9.95, #6567 - $14.75, #6581 - $12.85, PLA/82S100 - $13.85, 901 ROMS at $10.95 each, C128 ROMS - $39.95 (set of 3) and many others ..."THE COMMODORE DIAGNOSTICIAN" A complete diagnostic reference chart for fixing Commodore computers, etc. An absolute must for those who want to fix their own computers and save money and down time, $6.95 plus $1.00 shipping ... COMMODORE REPAIR ... We are the largest and oldest service center in the country. (eg. C64 - $54.95 complete) Fast turnaround ... Heavy Duty Supply for C64 - $27.95 .. VISA/MC .. Send for complete chips/parts catalog. Kasara Micro Inc., 35 Murray Hill Drive, Spring Valley, NY. 10977 1-800-248-2983 (Nationwide) or 914-356-3131

RTTY PROGRAM FOR APPLÆ MACINTOSH Baudot or ASCII, all usual speeds, customizable menus, canned messages, split screen and more. Use with simple TU or Packet modem. $39.95 ppd., send SASE for free info. Summit concepts, suite 102-190, 1840 41st Ave., Capitola, CA. 95010

FOR SALE - Two (2) "Mite" (compact) Teleprinters, Mil. # AN/TGC-14B, $150.00; Three (3) Kleinschmidt Labs (SCM) AN/UGC-74(V), KSR Baudot/ASCII 45.5 TO 1200 baud, Has memories and use as word processor too! Basic technical manual $30.00; TT33 ASR (2) 60 cycle, one (1) 50 cycle motor, $90.00 each; QSL's printed - "Eye Ball" 3 1/2 X 2" (500) $16.00 PPD, same size art - no changes, send copy; D. Testa, 390 Lincoln Ave (RJ), Newark, NJ. 07104

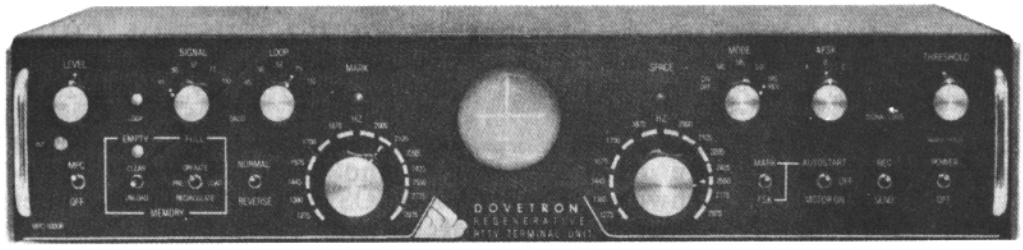
NEWS - NEWS - NEWS Amateur Radio's Newspaper "WORLDRADIO". One year subscription is $11.00. Contact: WORLDRADIO P.O. BOX 189490, Sacramento, Ca. 95818

WANTED - Teletype picture tapes. Also need 4-1000 tube - Donald J. Spreeman, 542 E. 20th St, Kaukauna, Wi. 54130

BACK ISSUES: A duplicate of any back issue of the RTTY Journal may be obtained from: Red Wilson, WB0ESF, 4011 Clearview Dr., Cedar Falls, Ia. 50613, $1.50 PPD & SASE. Reprints of both UART articles $2.00 PPD

MPC-1000R BY DOVETRON

MULTIPATH CORRECTION, IN-BAND DIVERSITY, SIGNAL REGENERATION, UP-DOWN SPEED CONVERSION, 200 CHARACTER FIFO MEMORY, KEYBOARD-CONTROLLED WORD CORRECTION & DIGITAL AUTOSTART



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The DOVETRON MPC-1000R is a complete Transmit-Receive modem designed for optimum radio teleprinter communications on land, sea and in the air.

Standard features include a high level loop supply and keyer (neutral or polar), EIA and MIL FSK outputs, a phase-continuous AFSK Tone Keyer with three selectable Mark - Space - Shift tone pairs, Mark, FSK & Digital Autostart, Automatic Markhold, an internal RY Generator for terminal unit Self-Test and circuit adjustment, and a Signal Loss Alarm circuit.

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