

The New

RTTY Journal

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Taka (Takashi Yoshizaki), JA3BN, shares his shack with us.

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*The word "P-Mode" is the HAL designation for a communications protocol that may be also known as "Pactor" a registered trademark of the Spezielle Communications System GmbH (SCS) firm in Hanau, Germany. HAL affirms that, to the best of its knowledge, "P-Mode" is compatible and interoperable with the protocol SCS calls "Pactor" and with the link establishment and weak signal modes of the protocol SCS calls "Pactor-II".

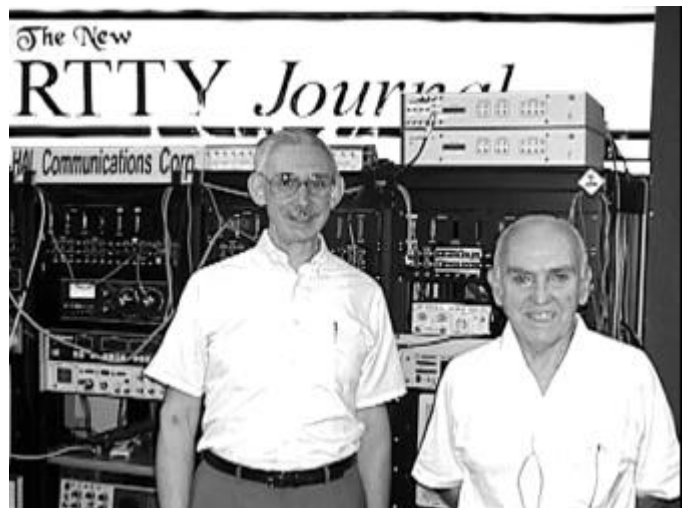


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Long time RTTY Op, Carlos, stopped by for an Eyeball QSO on June 18.

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Hits & Misses

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Welcome to the third edition of *The New RTTY Journal*. Again, thank you for your support. Keep making those suggestions. This time we have an article by Tom Kleinschmidt about the Kleinschmidt history, a comparison of mode performance by Bo Lindfors, some hints from Ron about what to do - and not to do - in the CQ/RJ WW DX Contest next month, and of course more pictures.

I'd like to offer a few editorial words on a topic that is near and dear to my heart - and to a lot of you judging by my letters. The issue is "HF radio is dead" - or sometimes even, "amateur radio is dead". I've seen a lot of this sort of comment recently and the most-named culprit is **The Internet**. Well, a lot of people have been claiming the end of the world - or ham radio - for a long time. It has not happened yet. Obviously, there are many of us who don't believe this. But, if we're not careful, it could happen. Consider a modern variation of the "Chicken Little" fairy tale:

It's early 1995. Jim and Rus are having a cup of coffee before work and talking about ham radio. Jim says, "I tried 15 meter RTTY last night and didn't hear a thing." Rus comments, "yes, I had the same problem on 20 last week". Jim says, "Boy, the bands are sure dead. It's about as exciting as watching grass grow. Speaking of which, think I'll just leave the radio turned-off and work in the garden. At least something happens once in a while." Rus says "Yes, I dug out the old golf clubs last weekend. Sure beats sitting there listening to waterfalls on 20. I enjoyed that hamfest last fall and I really like some of the new gear I saw. But, why should I spend money on a new radio when propagation is lousy?" Jim agrees and adds "Yes, especially since it seems that most hams are on the Internet these days." The two head off to work. During the next month, Jim and Rus talk to other hams in town and all soon agree that radio conditions are bad and getting worse. The word is out "Ham radio is dead". The word spreads rapidly from town to town - like "wild fire". Soon many hams in the state and all across the nation are convinced that "HF radio is dead". Few hams even bother to turn on their transceivers. Of course, now the bands really are dead - nobody is even trying to "make noise". As the sunspot cycle weakens toward the minimum in 1997, signal

propagation is poor and there are less signals to propagate. But - propagation hasn't really disappeared completely. In fact, NEW RECORDS are set by those few die-hards who do put signals on the air (e.g., WF1B in CQ/RJ WW RTTY Contest, Sept, 1997). Sunspots are coming back, but darned few hams may be around to know about a "band opening" when it does happen.

The point is that the "gloom and doom" attitude started by just a few people can become a self-fulfilling prophecy. Certainly, HF propagation has not been up to sunspot maximum levels. But, for those few hams who have been determined, persistent, and skilled, the rewards have been great. At times, DX has been very good on 20, 40, and 80. But only if you knew when to operate, what direction to point the beam, and had the patience to listen to a few "waterfalls". Actually, the amount of time spent in the "waterfall mode" is considerably less when you have good equipment - good antenna, good receiver, - and - a great modem (yes, I'm biased).

What can we do about this situation? I have some suggestions. First, get on the air and make some noise. Yes, the band may be "closed" - but it could also be open and without signals. During the 1960's, I spent a lot of time listening to waterfalls on 2 meter SSB and CW. The consensus at the time was that 144 Mhz was such a very high frequency that band openings rarely (if ever) occurred. Then - along came 2 meter FM in the 1970's. WOW, what a difference! All of a sudden we found that 2 meters was open very often - sometimes for days at a time! One guy even claimed that all of those blamed FM signals generated so much RF that a new ionization layer was created (obviously a CW/SSB guy - and the same guy who bought that bridge in New York). Two meters had been "good" all along, but we never had enough signals spread around the country to know when it was or wasn't open. The very same thing has been happening on 20 and 15 on a global scale. We've had good conditions, but few signals to propagate.

Second, lets put some "smarts" in our operating practices. Most of us go to work on an "8-to-5" schedule. We want to come home and play on the radio in the evening. That's convenient for us - but may often be the *wrong*

time of the day to work DX. Two things must be considered. The first is propagation and we're pretty good at this these days. There are all kinds of computer programs we can get (and should get) to compute best frequencies and times of day to work each country from our location. More importantly, we should ask ourselves "What time is it at the DX station we want to work?" Consider the convenience of operating from the DX station's viewpoint. Calling CQ at 7PM in Illinois is great for me but that's 2AM for most of Europe and later (earlier?) in Moscow, Johannesburg, and places further East. It's far more likely that you will find signals on the air from DX countries when the time *there* is convenient. Put yourself in the other guy's shoes and choose your operations to fit your *best chance* to make the contact.

Finally, we should all use our heads for something other than a hat rack. If I or anyone else says that HF is dead, go turn on the radio and check for yourself before you sell your gear or spread rumors! Or - you can choose to be just like "Chicken Little" - and - the sky (or, in this case, ham radio) will fall!

See you in November. de K9GWT

Comments heard here, there, and someplace else - about RTTY and Field Day:

"... I am proly 'preachin to the choir'... but ... about 'CQing': Even during my senior moments, I know what time it is and I can even search and come up with the correct date! What I'm interested in is the QTH. All that is accomplished with the date/time stamp is the listening audience can see just how far your computer time is from WWV. ... When in a QSO, please send both calls - at least occasionally." (George Claussen, N7GC)

"... Since when isn't FD a CONTEST? Someone hinted that FD wasn't a contest. D..! I've been fooled for the past 41 Field Days!" (Jan Carman, K5MA)

"... Keep West Virginia Beautiful .. Grow ALUMINUM!!" (Roy Maull, N8YYS)

"Field day in South Florida was very unusual this year ... It did NOT rain!" (Pete Rimmel, N8PR)

"... K8UC had two stations up - mostly down - for FD. We were hit by really nasty storms at 2000 EDT Sat and lost our main tent with food for the night. Fortunately we didn't lose any equipment, the food was bad enough." (Roy Maull, N8YYS) [I recall FD food that bad - ed]

"We [Florida Boys] almost had "WAS" in 24 hours worked all states except CO, ND, NV and VT." (Don Winn, AF4Z).



Yet Another Comparison of HF Digital Modes

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There have been several articles in different magazines serving the amateur radio community comparing the performance of our past and current digital modes of communications. I feel that all published performance results are overly optimistic. In this article I will present the results of my own on-the-air comparisons of four different modes as observed in operation on my own multi-mode, multi-port, Digital Message Switch (DMS, Navy-Marine Corps MARS' new acronym for BBS's and MBO's).

Navy-Marine Corps MARS (NAVMARCORMARS) started shifting its HF national traffic system from radioteletype (RTTY) to more modern digital modes in the late 1980's. We began with an APLINK based AMTOR system in place of RTTY. A separate HF Packet system based on the CBBS Group Packet BBS system was established for research and development purposes. A portion of the normal RTTY traffic was sent to the packet network to exercise the system. The APLINK MBO system provided acceptable performance but did not perform true unattended automatic forwarding. The CBBS Packet BBS system, on the other hand, provided true unattended automatic forwarding but, due to using HF Packet, provided dismal throughput.

During 1991, NAVMARCORMARS evaluated several AMTOR MBO and Packet BBS programs with the goal of choosing one program to be adapted to meet our needs, namely, both modes in one program. One major factor was that the software source code be available for performing our own modifications. Eventually, the AA4RE Packet BBS system was chosen (not unanimously, I must admit) and work was begun to modify it to operate in both Packet and AMTOR and be compatible with current Packet BBS programs and the APLINK type MBO. AA4RE Version 2.12 was chosen as the base version rather than the beta versions under development by AA4RE. An AMTOR (users only) and Packet version began alpha testing in early 1992. Before we could add full APLINK compatibility, the direction was shifted to include PacTOR capability with the SCS/PacComm PTC's. The initial version was on-the-air by late 1992 and fairly stable by early 1993. When AEA added PacTOR

capability to the PK-232 in March, 1993, APLINK capability was again postponed to accommodate the PK-232 in PacTOR. This work was completed by summer, 1993. Full compatibility with APLINK, AMTOR was added by October 1993. This program underwent several modifications which added WinLink compatibility in both AMTOR and PacTOR.

In September 1995, NAVMARCORMARS received AA4RE Version 2.1S source code, which included CLOVER-II capability. AMTOR and PACTOR specific code was successfully integrated into the 2.1S source code, creating version 2.12J (the latest NAVMARCORMARS version). AA4RE had by this time decided to no longer support the BBS code and turned over all code then under development to NAVMARCORMARS. By early October 1995, the code work was complete (including adding WINLINK CLOVER-II compatibility). A testing program was begun using one station in Virginia, one in Maine and the USS AMERICA, deployed to the Mediterranean at the time.

The testing program was set up to measure total system throughput rather than measure throughput only during file transmission. Timing was started when the BBS's first connected and ended with the disconnect at the end of the transfer. The only data counted for throughput calculations was the actual size of the file being transmitted. Overhead data, though transmitted, was not counted in determining throughput. The results shown in Table 1 were obtained (throughput is in characters per second, cps):

CLOVER-II does not employ any file compression. PacTOR utilizes Huffman compression but its value is limited since NAVMARCORMARS messages are completely in capital letters. A small utility program was developed by the author to compress large files using PKZIP and then convert them to all ASCII characters using Radix-95. (Use of this scheme allowed the files to be relayed by any CLOVER-II, Packet or PacTOR DMS without special handling enroute.) The resulting files were then transmitted via the CLOVER-II mode. Processed files were 50 to 60 percent of the size of the original data files. Files transmitted using CLOVER-II in

AVE. FILE SIZE (BYTES)	THROUGHPUT		
	CLOVER-II	PACTOR	AMTOR
UNDER 1000	8.4	5.8	2.1
1001 - 2000	12.8	8.1	NA
2001 - 5000	21.0	7.6	4.7
OVER 5000	24.8	NA	5.1

Table 1.

this manner achieved actual throughputs of 12.6 to 24.8 cps. With the file compression factored in, the virtual throughput was 24.4 cps to 46.4 cps.

NAVMARCORMARS invested in several CLOVER-II boards and attempted to operate one half of the National Data Network (NDN) on CLOVER-II while the other half continued using PacTOR only. Problems were encountered because of poor weak signal capability of CLOVER-II, so PacTOR was retained on the same frequency as CLOVER-II for those stations so capable. Currently, 3 of the 6 NDN stations on one half of our NDN continue to use CLOVER-II successfully.

Recently, NAVMARCORMARS has tested two CLOVER-2000 modems. To maintain consistency of results, the same criteria for measuring throughput with CLOVER-II was used in the new test of CLOVER-2000 (except that exact file sizes were used). Table 2 shows the results that were obtained (the data in parentheses were the range of throughputs actually measured):

Although it seems counter-intuitive, better throughputs were obtained using Robust Bias and a higher setting for the Chat parameter. The only explanation that comes to mind is that the upshifting of phase modulations programmed into the firmware is too aggressive and results in too many repeats in normal bias. The increase in Chat setting was attempted to reduce the time required for initial DMS exchanges and appears to have helped as times were nearly halved.

Once again, no file compression was utilized. Had the same PKZIP/Radix-95 scheme been used as for the CLOVER-II tests, CLOVER-2000 would have seen virtual throughputs of up to approximately 105 cps.

Having worked with AMTOR, Packet, PacTOR, CLOVER-II and CLOVER-2000 since 1991, both programming for their use in a fixed system and operating a multi-port, multi-mode DMS for almost the entire time, I offer the following observations:

A. The PacTOR protocol contains an as yet unacknowledged and uncorrected flaw that has caused traffic to be mis-directed in our

NDN. (This same flaw is in PacTOR-II as well.) Namely, there is no error correction in the transmission of the call sign when connecting to another station. In the case of our system, all stations have call signs that differ by only one character (NNN0MDQ, NNN0MDR, etc.). The DMS program had to be modified to immediately disconnect if the wrong station responded. This causes that forward cycle to that station to be lost for that forwarding time slot. This does not occur in any of the other modes tested.

B. PacTOR (I and II) have very good weak signal characteristics, and will connect and

Exact File Size (bytes)	Throughput	Throughput	Throughput
	Normal Bias Chat = 8	Robust Bias Chat = 8	Normal Bias Chat = 1
625	8.9 (7.8 - 9.8)	8.9 (7.5 - 9.8)	7.4 (6.5 - 8.6)
1250	17.0 (9.7 - 21.5)	14.7 (11.2 - 17.9)	14.0 (12.8 - 15.4)
2500	27.7 (22.7 - 30.9)	23.5 (17.5 - 28.1)	21.4 (17.0 - 25.0)
5000	40.6 (30.5 - 51.0)	46.4 (37.3 - 58.8)	35.9 (32.1 - 37.0)
10000	55.3 (37.9 - 67.6)	54.8 (41.3 - 67.6)	52.4 (37.9 - 63.3)

Table 2.

get the traffic passed as well as AMTOR. CLOVER-II does not work as well in weak signal conditions. Weak signal characteristics of CLOVER-2000 have not been observed for long enough to make a determination.

C. There is no standard established for link change-overs in the PacTOR mode. We chose the AMTOR type of change-over where the DMS's seize the link when the appropriate response has been received. WinLink chose to go in the opposite direction and our program had to be modified to handle that difference. Personal MBO's included with most multi-mode TNC's operate differently as well. A "standard" sure would be nice for the programmers and promote greater interoperability.

D. The NAVMARCORMARS NDN was developed to automatically forward emergency traffic as quickly as possible. Our modified AA4RE system is capable of recognizing message precedence and forwarding

higher precedence messages ahead of all those of lower precedence. We have even gone to forwarding these high precedence messages every 15 minutes rather than once an hour. All this is for naught, however, because we are stuck on fixed frequencies that are affected by propagation. The only solution is an effective and inexpensive Automatic Link Establishment (ALE) system with a broad range of assigned frequencies. Unfortunately, there is as yet no such system within the reach of our affiliate members. Software scanning programs don't work on all the radios in use in our system and so are not a viable option.

You are probably asking yourself what happened to G-TOR. Unfortunately, G-TOR cannot currently be operated in an unattended forwarding DMS because the manufacturer has not included a method to determine whether the channel is clear of any other digital transmissions. Since NAVMARCORMARS runs only unattended DMS's in order to provide 24-hour per day coverage, use of G-TOR would cause many data collisions and

effectively lower throughput for all stations on the channel.

What's the bottom line? AMTOR, PacTOR, CLOVER-II and CLOVER-2000 all have a place in our HF digital world. PacTOR and CLOVER are the modes best suited for unattended, automatic, forwarding operations while AMTOR is best for keyboard-to-keyboard operations. PacTOR operates best for weak signals and small files while the CLOVER modes work best for good band conditions and large files. The CLOVER modes appear ideally suited for ALE operations, when, and if, ALE systems become affordable for amateur radio operators.





A Little TTY History

(Part 1)

Tom Kleinschmidt

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The Teletype ® machine in the United States had its roots in New York and Chicago in the early 20th century. Charles L. Krum, Howard Krum (father and son) and Edward E. Kleinschmidt are the "co-inventors" of the teleprinter. The Europeans were working on printing telegraph as well, but that story is for another time. Two U.S. competitors came together and later went on to compete again.

The Morkrum Co. (named for Morton and Krum) got its start when Joy Morton agreed to back Frank Pearne who was experimenting with a printing telegraph system. Charles Krum a mechanical engineer and vice president of the Western Cold Storage Co. was the technical consultant to Joy on the venture and joined in the development. In 1902, they set up a lab in the attic of Western Cold Storage in Chicago which was owned by Mark Morton (Joy's Brother). Morton Salt was in the technology business long before they made space shuttle boosters! Pearne lost interest when the first year's efforts were unsuccessful. But, by 1906 Charles Krum had made much progress. His son, Howard with a fresh electrical engineering degree, joined his father in developing the teleprinter. On October 5, 1907 the Morkrum Co. was formed with capital of \$150,000. The patent for Howard Krum's key development, the Start - Stop system for printer synchronization, was applied for in 1909 and granted in December 1918. As a side note, in July 1917 Morkrum employees went on strike for a 48-hour workweek causing street riots! The Morkrum Co. product brand name was "Teletype" ®.

Meanwhile in New York City, E.E. Kleinschmidt began working on telegraph apparatus in 1893 under John E. Wright. He opened his own company, in 1898, doing diverse development work, including a system for facsimile telegraph. This idea was rejected by Western Union in 1900 but patented in 1902. Another 1902 Kleinschmidt patent was for an "Apparatus for Twisting Macaroni". He also patented fishing reels, worked on Elmer Sperry's gyrocompass and designed a vacuum cleaner called the Vacuna among other projects. Much of his design efforts from 1906 to 1911 were focused on railroad signals for George M. Seely. Seely

also introduced Goodspeed and Moore. They would be among his financial supporters. In 1911, Kleinschmidt showed his first keyboard operated Morse code perforator to Western Union. He received an order for fifty units! The Kleinschmidt Electric Co. was incorporated in 1913. Company officers were Edward and his two brothers Bernard and Fred. In 1917, Kleinschmidt Electric was in need of cash and Edward Moore of National Biscuit (later Nabisco), Charles B. Goodspeed of Buckeye Steel Casting Co., Paul M. Benedict of the Chicago Burlington and Quincy Railroad, Eldon Bisbee a lawyer, and Albert Henry Wiggen president of Chase National Bank agreed to finance the company.

The Morkrum and Kleinschmidt companies were the leading teleprinter makers from 1917 to 1924. As competitors they were vying for the few major customers that used their products: AT&T, Postal, and Western Union (Postal was later purchased by Western Union). These customers played Morkrum against Kleinschmidt to get the lowest price. The situation evolved to the point where winning a contract was no better than losing it! There were no profits to be made. Realizing the situation, Morton contacted Charles Goodspeed to talk about a merger. The deal was "all set" in 1923, but it fell apart at the last minute. Sterling Morton, Joy's son and a manager at Morkrum, sued Kleinschmidt Electric for patent infringement. Of course, Kleinschmidt immediately counter sued. Morton and Goodspeed understood that both companies would loose in an entangled legal fight and perhaps neither one would end up with patent rights! The suit was Morton's way of bringing matters to a head. With the threat of expensive litigation hanging over the two companies, they agreed to merge in 1924, creating Morkrum-Kleinschmidt Co., headquartered in Chicago. The company changed its name to Teletype Corporation ® in February 1929.

The saga will continue as Part 2 in the November issue.

Tom Kleinschmidt is a great grand son of Edward E. Kleinschmidt
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On The Road With NADCOMM

Here's the saga of Rob House's recent "road-trip" to collect and preserve teleprinter equipment - "Charles Kuralt of the Green Keys"?

On June 19th, after a year of planning and many delays, I set off on my road trip to save more data communications equipment for our museum. I left Fallbrook in my '94 Ford Ranger, making it to Beaver, Utah the first night and then to Ogalala, Nebraska the next day. Those 15 hour days were wearing as I only had myself to talk to! At the end of the third day, I was in McHenry, Illinois.

After a "false start" trying to rent a 6x12 trailer from one well-known company, I finally connected with "Wells Cargo" and was on my way by afternoon. The so far empty trailer and I were soon in Waunakee, Wisconsin picking up a mint 19ASR from my webmaster, Roger Bindl. Roger had put the 19 in his garage many months earlier at my request from a posting on the "Greenkeys" e-mail reflector. I then drove on to the Ameritech regional computer center in Northbrook, Illinois to meet up with my good friend of over 30 years, Bob Cnota. Bob is one of the NADCOM directors and is always "keeping a eye out" for equipment to save it from the scrapper. Tom Kleinschmidt, our Vice-Chairman and Midwest Curator, joined us and we all had a good time looking over the facility and finding many "treasures" to preserve. We did not finish until 9:00 p.m.

Tom and I then drove to his home in Prospect Heights and loaded up the numerous items he had been saving for me for almost a year. After a late "thank you and good bye" to Tom and his lovely wife, I made it to Hammond, Indiana that night. The next day was mostly heavy traffic and poor roads all the way to Muncie, Indiana to pick up "treasures" from Joe Montano. Here, I acquired a 14 TD, a KL RO and a US Navy facsimile machine. From there it was off to Sullivan, Indiana to spend the night (and have a nice swim next morning).

Now it was time to head back west, via Tulsa and then to Alamogordo, New Mexico to meet with the very kind and helpful Bill and Jackie Johnston. This required an off-road trip in Bill's 4 wheel drive Suburban to a mountainside storage building where we unearthed several WU Tape Printers and another 19 ASR. After a great night at their ranch near White Sands National Monument, I balanced the load, re-calibrated the electronic brake controller, and headed out for Green Valley, Arizona and then on to Fallbrook on June 30. Many, many thanks to all those who contributed to the successful 5,500 mile trip that has greatly benefited our museum.

Don Robert House, Curator and Chairman,
NADCOMM
nadcomm@usa.net

FIELD DAY 1998



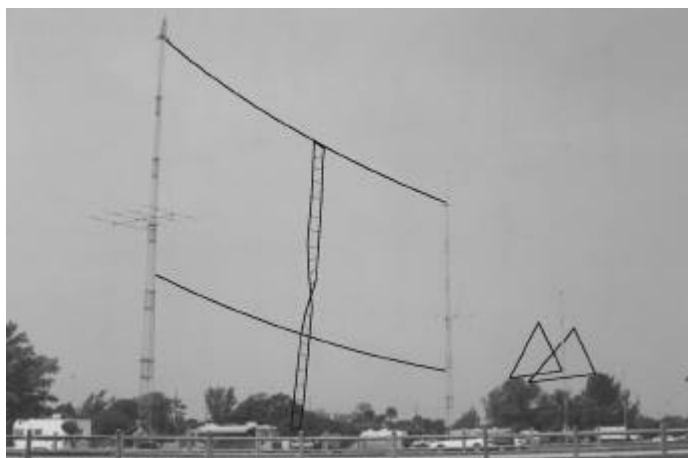
Faith, N1JIT, OP: W1DVC - Harvard Repeater Club, photo by Dan, N1JEB.



Pete, N8PR, operates field day with Palm Beach ARC (also, see below)



Joel, KA1PRT, operates and Susan, N2ZOF, logs
TARA, Troy, New York (Photo by: N2WJG and KC2BRY)



N8PR, shows the six op. locations, with two 100 foot and one 86 foot crank up towers. Also shown is a lazy "H" and a two element delta loop for 40.



Bill, NY2U Bill, KB2VQT Steve, KB2SIX
President of TARA, NY



Layton, KE3ZZ introducing Jayne, N3UFF to RTTY.
The Nanticoke ARC, Seaford, Delaware, set up FD at Trap Pond State Park.



Switch It

Part (1)

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Hooking up your first RTTY station can be a humbling experience. You gotta have wires going from the speaker to the modem, modem to the PC, modem to the transmitter, here to there to the water pipe, leg bone connected to the - huh? - wait a minute. AND, if you read all the words in the manual, it all has to be shielded and soldered to an impossibly small connector with even smaller pins. After several tries with the soldering iron (and maybe some retries using a magnifier), most of us get through this stage and end up with one transceiver connected to one modem connected to one PC. Whew! That was a job, wasn't it? Cheer up, it used to be a LOT worse when we had machines and loop circuits to connect. The life of the RTTY ham is actually much simpler these days.

A typical radio-modem-PC hook-up is shown in Figure 1. Notice the *ground connections*. Good grounds are absolutely essential to eliminate problems with "RFI" - Radio Frequency Interference. Many times, cables that work great when receiving become wonderful antennas when transmitting - everything blows-up when you go on the air. Before this happens, include ground wires

when you make cables - big *fat* wires, not #22 bell wire. I like to use 1/2" wide shield braid. Also, run the *shortest* cables you can. In the vicinity of your transmitter, 10 ft. is a long cable. 3 ft. long or even shorter is *much* better.

You finally get it all working in both transmit and receive - AND THEN — you get another radio — or, better yet, you get another radio AND another modem. It's a certainty that your very next "bright idea" will be, "let's fix it so that either radio can be hooked to either modem." AND -you will also want to wire two PC's so that they can use either modem. Let's talk about how to do this and more - and still keep our sanity.

1. One radio, two modems:

This is the simplest switching circuit. The most direct approach is to use a switch section for all signals. This would require a 4 pole, double-throw (4PDT) switch. However, we can "cheat" a bit and just wire the receiver audio to both modems. That way, either modem can be used to monitor what you hear. This connection, shown in Figure 2, only requires a 3PDT switch. If you don't need the

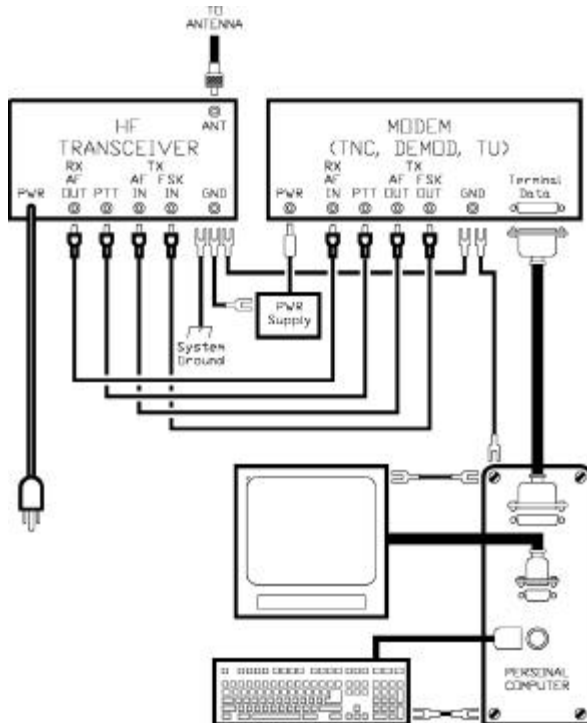


Figure 1. "Typical" Radio-Modem-PC hook-up

"FSK transmit" signal, you can get by with a plain old DPDT toggle switch.

2. Two radios, one modem:

This is the reverse of case #1. And, as you can see from Figure 3, it's just a matter of re-arranging the labels on the block diagrams. In this case, we can usually parallel-connect the transmit audio to each transceiver. Be sure that VOX is turned OFF or you may get TWO signals on the air at the same time! Again, if you don't need "FSK transmit", a DPDT toggle switch is great.

3. Four radios or four modems!

If you'd rather not do the wiring, have a look at the Radio Shack #15-1956 Stereo Audio/Video switch box (\$24.99). This neat little box has four push-button switches that are designed to let you switch one TV and Stereo to up to 4 different audio/video gadgets. With a small modification, it is an ideal accessory for our RTTY station. Figure 4 shows the schematic diagram of the box; Figure 5 shows the front and rear panels, and Figure 6 shows the "guts" on the inside. This box includes four 75 ohm resistors to "terminate" a video source (VCR, etc.) when it is not selected. For RTTY station use, I recommend that you take the top cover off the Radio Shack box and clip these little guys out of there (see Figure 5). Put the cover back on, that's the end of the "modification"!

4. Phono Connectors:

Note that all signal connections are made to rear panel "RCA-type" phono connectors. A lot has been said about these connectors - pro and con. I've both "cursed" and "praised" the things many times. The "RCA-phono connector" can be the worst thing you've ever had not work! But they are cheap, readily available, and can be very reliable - IF - you are picky. Not all "phono" connectors are made equal. Don't buy the cheapest cables or connectors you see. BUT - I've never seen a situation where my ham station needed \$10 or \$20 "gold-plated, super-duper audiophile" connectors. The things look pretty but I doubt that you'll work any more RTTY stations with gold connectors. Phono connectors also have the advantage that you can make ready use of cables that already have molded-on connectors at each end. I buy the cables at Radio Shack - or a hamfest. Buy new cables. Used cables may already have problems.

To make connections at the radio, I cut-off one end of 3 or 4 phono cables, strip & tin the center conductor & shield wires, and hook them to the itty-bitty pins on the radio's DIN connector. READ YOUR MANUAL! The numbering on DIN connectors is NOT necessarily done in a logical manner! Making this cable IS a painful task. But, since this set of

cables will give me phono connectors for each radio signal, I can use this cable as my "adapter" for any connections I need to make to the radio. The same goes for the RTTY modem. Make one cable that ends in phono connectors for each transceiver and modem. You can now make use of all those neat "Y" and other phono adapters. Use phono "barrel" adapters to hook one modem to one radio. And, you can also plug the phono connectors right into that Radio Shack switch box in Figures 4, 5, and 6. Life just got to be a LOT simpler, didn't it?

That's all for this issue. Next time I'd like to show off my patch panel idea I use here in the shack at HAL. Until then, 73 de Bill, K9GWT

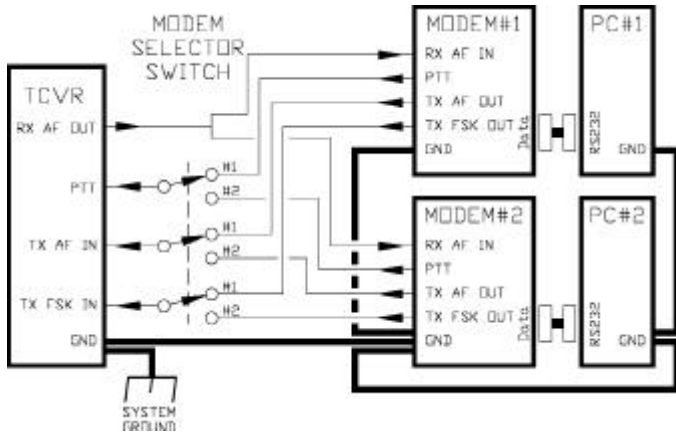


Figure 2. One Radio - Two Modems

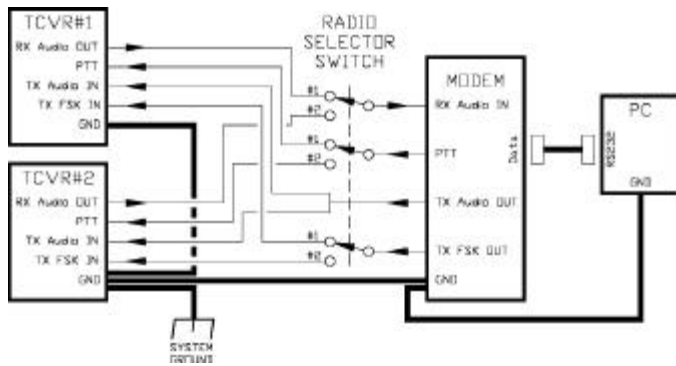


Figure 3. Two Radios - One Modem

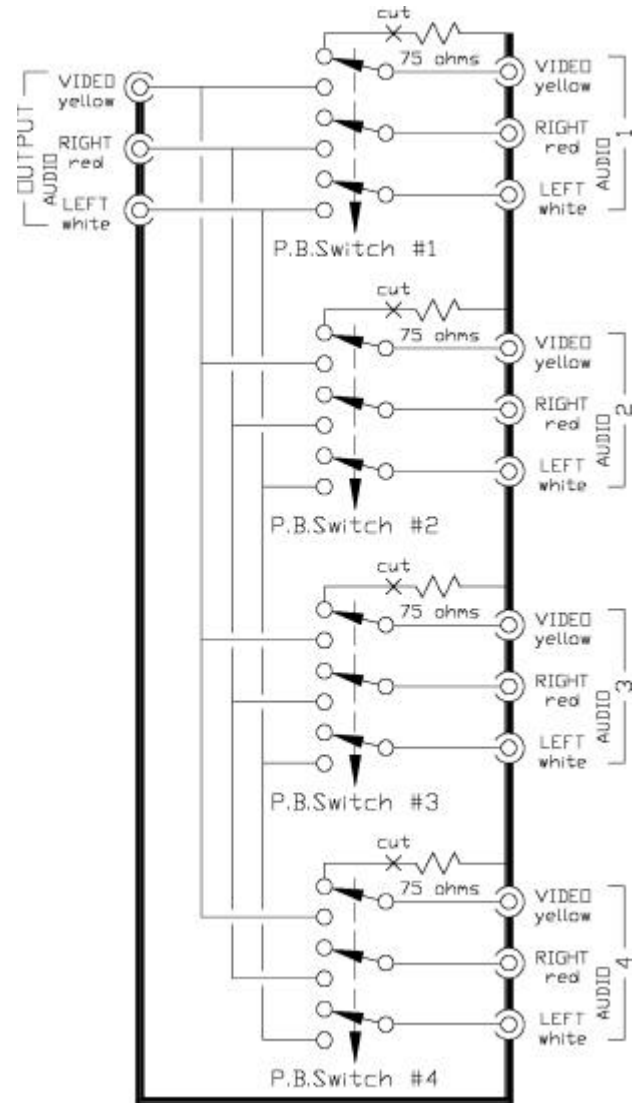


Figure 4. Four Radios or Four Modems Schematic of Radio Shack #15-1956



Figure 5. Front/Rear View of Radio Shack #15-1956

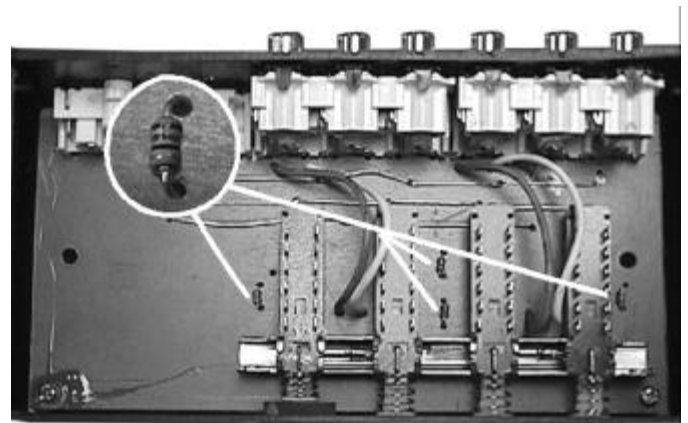


Figure 6. Inside View of Radio Shack #15-1956



RTTY Contesting

Ron Stailey, K5DJ

Ron-Stailey@easy.com

Hello Contesters and DXers.

This month, I want to talk about the do's and don'ts in contesting. This is very important, especially if you're a guest operator and if you use someone else's call sign. Some fellows never get invited back to choice locations because of things they have done or haven't done.

Naturally, it is very important in contesting to get all the hardware tweaked up. This means check the antennas, radios, modems, cables, clocks - everything. Most of us think of checking the gear. But, don't forget to also check your software. After the contest starts, your software is key to good operation. It needs to be checked out long BEFORE the start of the contest. If you don't, it is very possible you will be mumbling comments and saying more than a few choice words (I've several good ones I've been know to use). Good software that works right is the operator's "bread and butter" for contesting. Testing software is especially important if you're going to use a new version. I assure you no matter how much you beta test a program before it comes out, there can be surprises - and *always* at the worst time in the contest. You could find yourself logging by hand, asking yourself what contest is next month (this one's over for you), or, at best, playing catch up football. It's very tough to catch the top operators unless they have also made mistakes - not likely! Play with software *before* the contest, not during it!

A couple of years ago Tyler, K3MM wrote an article titled "Never Never Give Up". Tyler wrote a good article and all of it was true. However, just try to catch him if you're having problems and he isn't. It could be done but don't count on it. It's like asking for rain in the middle of a true West Texas sandstorm. By the way, a TRUE West Texas sandstorm is when you look up and see Quail walking.. :-)

Contest operating skills for CW and SSB operators have been discussed frequently in other magazines. I have a folder of the best articles I feel are important in a contest. When reading these articles, you soon discover that there are two sides to every story. CW & SSB operators often complain that calling stations do not give their call often enough. This is not

as big a problem when operating RTTY but we do come across operators who make a contact and then just say "QRZ". My first thoughts are "Who are you?" and "Why don't you give your call?" There may be, in fact, several good reasons the station did not give his call. If the station is in a rare location, the operator already knows he will get plenty of calls. A huge pile up is impressive but useless to the DX contest operator unless he can control it and work callers at a good rate. For this reason, many DXpedition operators do not give their call after each contact. They don't want a bigger pileup than what they can handle. There are several ways to work around this. You can work him and then ask for his call. If he is a dupe you have wasted your time and his, especially if it took you a long time to make the QSO. Here is a tip I got from Gary Sutcliffe and his W9XT NCJ column a few years ago. If you have this problem and are doing a lot of S&P (S&P = Search and Pounce - ed), make a band chart. Write the DX station's call and frequency on a sheet of paper. As the contest continues, put all the calls high in the band on the right side, all of the calls in the middle of the band in the middle of the paper, and all the lower band calls to the left. Some programs include band map capability. If your programs does, use it - but practice *before* the contest! If the DX station has a big pileup, he'll be there for a while and you can go work other stations while waiting - be sure to check his frequency often, however. You may also ask for his call when he first acknowledges you, something like: "UR CALL PSE UR 599 04 TX. DE K5DJ BK". This has worked for me many times.

Here is another idea from W9XT that would be a nice feature to include in contest software. Include a key the operator can press that will tag the frequency when you tune across a pileup for a station previously worked within the last thirty minutes. The computer would then let you know "it's a dupe" if you pause your tuning on (or close to?) a tagged frequency. Oh yeah, while you are tuning, and tagging, and so on, be sure to watch the packet cluster for that "mystery station" you've been chasing.

I was discussing this on the phone with Eddie, G0AZT, the other day and he passed along a couple of his "pet-peeves". One is the

guy who answers your CQ with his contest exchange - *before* you have acknowledged his call sign. If you are digging through a big pileup, this sure can mess up your rhythm and add to the QRM. I would much rather work the guy who waits for me to acknowledge his call, sends me his exchange, and then QSY's to let the next caller in. Send your call sign and then wait to be acknowledged. While on this topic, give me your report just ONCE unless I ask for a repeat. The guy in the CQ/RJ WW contest that answers "UR 599 599 599 IN ZONE 04 ZONE 04 ZONE 04" will probably be talking to himself by the time the 3rd "599" comes out! If you want to be "different", leave off the "599" signal report all together. I assure you no one will ask for their RST!

Another of Eddie's complaints (and mine) is the guy who sends my call three or four times and his call once - for example: "K3MM K3MM K3MM de K5DJ BK." Nine times out of ten, Tyler will copy the three K3MM's but take a hit on my call. He already knows his call sign. What he doesn't know is *my* call! Send the other guy's call once and your call two or three times.

Operators that start calling CQ before checking to see if the frequency is busy can really mess up a QSO - and it's always with that rare

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1998 CQ/RJ World-Wide RTTY DX Contest

September 26-27, 1998

0000 UTC Saturday to 2400 UTC Sunday

Sponsored by CQ Magazine and The New RTTY Journal

Contest: Amateurs around the world contact other amateurs in as many CQ Zones and Countries as possible using digital modes.

Contest Period: STARTS at 0000 UTC Saturday Sept. 26, and ENDS at 2400 UTC Sunday Sept. 27, 1998.

Note: All stations and operator classes may operate the entire 48-hour period; there are no required off time periods for any entries.

Bands: 80, 40, 20, 15, and 10 meters.

Operator Classes: There is a High Power category (greater than 150 watts) and a Low Power category (less than 150 watts). Only Single Operator All Band and Multi-Op Single Transmitter entries are eligible to enter the High or Low Power category. Enter one or the other, and so note in your log. Single Band entries, Single Operator Assisted, and Multi-Multi entries are not eligible to enter the High or Low Power category.

A) **Single Op, All Band and Single Band.** One person performs all operating and logging functions. Use of spotting nets, DX Alert systems, telephone, the internet, etc., is *not* permitted.

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

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

NOTE: Only one(1) transmitter and one (1) band permitted during the same period (defined as ten [10] minutes). Once the station has begun operation on a given band, it must stay 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 10-minute rule automatically will be reclassified as multi-multi to reflect their actual status.

D) **Multi-Operator, Multi- Transmitter.** All band entry only. No limit to the number of transmitters, but only one (1) signal per band permitted. All transmitters must be located within a 500 diameter or with

in the property limits of the stations licensee's address, whichever is greater. The antennas must physically be connected by wires to the transmitter.

Entry Categories: Single Operators may enter as (a) All Band High Power or Low Power, (b) Single Band; or (c) Single Operator Assisted All Band. Multi-Operators may enter as (a) Multi-Op Single Transmitter, High Power or Low Power; or (b) Multi-Op Multi-Transmitter, All Band

Modes: Contacts may be made using BAUDOT, ASCII, AMTOR, PACTOR (FEC & ARQ), CLOVER, and Packet (no unattended operation or contacts through gateways or digit-peeters).

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.

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.

Countries: The ARRL and WAE country list will be used.

NOTE: The USA and Canada count as country multipliers. *Example:* The first US State and Canadian area you work not only counts as a multiplier for the state or area, but also as a country multiplier for each band.

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

Multiplier Points: One (1) multiplier point for each US state (48) and each Canadian area (13) on each band. One (1) multiplier point for each DX country in the ARRL and/or WAE lists on each band.

NOTE: KL7 and KH6 are country multipliers only and not state multipliers. One (1) multiplier point for each CQ zone worked on each band. Maximum of 40 Zones per band. 13 Canadian areas: VO1, VO2, VE1 NB, VE1 NS, VE1 PEI, VE2, VE3, VE4, VE5, VE6, VE7, VE8 NWT, and VY Yukon.

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

Contest Entries and Logging Instructions: CQ/RJ WW RTTY DX logs and forms should

be used to facilitate scoring and checking. All logs must show:

1. Times in UTC.
2. All sent and received exchanges are to be logged (callsign, RST, Zone, country, State/VE, points claimed).
3. Indicate State/VE area Zone, and Country Multiplier only the first time they are 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). Logs must be checked for duplicate contacts, correct QSO points, and multipliers. Submitted logs must show duplicate contacts clearly marked.
6. A multiplier check sheet for each band.
7. An overall summary sheet showing total QSO's, Points, Zones, Countries, and States/VE areas worked.
8. Each entry must be accompanied by a signed declaration that all contest rules and regulations for amateur radio in the country of operation have been observed. Contest forms are available from CQ and the Contest Directors. Please include a large SASE with two units of US first-class postage or IRCs.
9. Disks: Logs may be sent on disc. Clearly label the outside of the disc with the call, file names, and type of program. All discs must be accompanied by a printed summary sheet., not the entire log.
10. Internet: Watch for an announcement of an Internet address to send your logs to also.

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

Awards: Plaques will be awarded to the first-place finishers in each of the operator classes. Certificates will be awarded to second and third places. Certificates will be awarded to the first-place finishers in each DXCC country. In countries or sections where returns justify, certificates may be awarded to second and third place. All scores will be published. To be eligible for an award, a Single Operator station must operate a minimum of 18 hours. A Single Band entry is eligible for a single band award only. If a log contains more than one band, it will be judged an all band entry, unless specified otherwise. All

certificates and plaques will be issued to the licensee of the station used.

Deadline: All entries must be postmarked no later than December 1, 1998. An extension may be given if requested.

Low Power logs should be mailed to:
Roy Gould, K1RY
CQ WW RTTY DX Contest Director
P.O. Box DX
Stow, MA 01775 USA.

High Power Logs should be mailed to:
Ron Stailey, K5DJ
Co-Contest Director
504 Dove Haven Drive
Round Rock, TX 78664-5926

Plaques(Donors): Single Operator and Multi-Operator All Band plaques are awarded to the high scorer, either High Power or Low Power, whichever is the highest.

Single Operator, All Band, High Power

World Dunestar Systems
N. America TG9VT Memorial by K1RY & W2JGR
S.America Donated in the name of Elmers worldwide who help new amateurs get started
Europe HAL Communications Corp.
Oceania HamStuff by W7NN
Asia N5JJ Memorial
Africa Phill Duff, NA4M
USA John Devoldere, ON4UN

Single Operator, All Band Low Power

World Amateur Radio Trader
N. America Dick Stevens, N1RCT
S. America Jim Hollenback, NK6L
Europe Don Hill, AA5AU
Asia Bruce D. Lee, KD6WW
Oceania Dave Barr, K2YG
Africa Bill Gallier, W4WX
USA The New RTTY Journal

Single Operator Assisted

World CQ Magazine
N.America Jeff Bouvier, K1AM
Europe The New RTTY Journal
Asia Kazuaki Ohya, JH1HRJ
S. America Great Lakes DX and Contest Club
USA RTTY by WF1B
Other Continents Open

Single Operator, Single Band

3.5 MHz Neal Campbell, K3NC/ON9CNC
7.0 MHz Tri-County DX Association
14 MHz Kunihiko Fujii, JH1QDB
21 MHz Denis Catalano, WD4KXB
28 MHz Open

Multi-Op, Single Transmitter, High Power

World Amateur Radio Trader
N.America Don Hill, AA5AU and Eddie Schneider, G0AZT
USA WriteLog Contest Software for Windows (by Ron Stailey, K5DJ)
Europe Euraf Communications, Benin (by Peter Schultz, TY1PS)
Other Continents Open

Multi-Operator, Multi-Transmitter

World CQ magazine
N.America The New RTTY Journal
Europe The W3LPL RTTY Contest Group
Other Continents Open

There are many plaques looking for sponsors: High Power, Low Power, Single Band, a specific country, Multi-Op by continent, etc. If you are interested, contact the contest co-director:

Ron Stailey, K5DJ
504 Dove Haven Drive
Round Rock, TX 78664
(e-mail: k5dj@easy.com)

**RTTY Contest Schedule
FALL 1998**

Date & Time	Name & Sponsors
8/15 0000 to 8/15 0800Z	SARTG WW RTTY Contest
8/15 1600 to 8/15 2400Z	Scandinavian Amateur Radio Teleprinter Society
8/16 0800 to 8/16 1600Z	
8/29 1200 to 8/30 1200Z	SCC RTTY Championship by Slovenia Contest Club 1998 and Svet Elektronike Journal
9/26 0000 to 9/27 2400Z	CQ / RTTY Journal World-Wide RTTY DX Contest CQ Magazine and The New RTTY Journal
10/08 0100 to 0300	IntNET Sprints
10/17 0000 to 10/18 2400	JARTS Japanese Amateur Radio Teleprint Society
10/31 1200 to 11/01 1200	BARTG Sprint ***NEW CONTEST*** British Amateur Radio Teledata Group
11/14 0000 to 11/15 2400	European DX Contest "WAEDC - Worked ALL European Districts Contest"
12/05 1800 to 12/06 0200	TARA Sprints Troy Amateur Radio Association

Rules and additional information may be found at the following Internet sources:

LA9HW RTTY Page:
<http://home.sn.no/~janalme/RTTY.html>

Jim's Gazette:
<http://www.n2hos.com/digital>

N1RCT Web Site:
<http://www.megalink.net/~1nrct>

SM3CER Contest Service:
<http://www.sk3bg.se/contest>

ARRL:
<http://www.arrl.org>

OR-
The New RTTY Journal will airmail a printed copy to you. For each contest, send \$3.00 for U.S., Canada, or Mexico destinations or \$4.00 to other countries. Please allow 3 weeks for processing and delivery.

Field Day 1998

RTTY is a separate mode (finally!)

Dan Senie, N1JEB

dts@senie.com

From the day that Faith (N1JIT) and I passed our exams to upgrade to general, we've been active on RTTY. Some of you may recall or have QSL cards from us with /AG after our calls. Over the years we have demonstrated RTTY for many local friends, and have influenced some of them to become active on the mode.

At Field Day 1997, we attached a KAM and my laptop to one of the stations and made a handful of contacts. A small group of folks watched as we worked the few stations out there on 20 meters. Since RTTY counted as CW, and the CW logs were in a different tent, on a different computer, we limited our operation. Several folks in our Field Day group were interested in giving RTTY a try, and expressed interest in it being more usable on Field Day.

After Field Day was over, I sent a few notes to ARRL staff at headquarters, as well as to my division director and vice director, and to Frank Fallon, N2FF, who is an ARRL Board member for another division and an active RTTY contester. In my letters, I suggested RTTY as a separate station, along the lines of the VHF station. I also posted a note to the wf1b-rtty email reflector on the Internet to drum up support from the other RTTY operators. Many RTTY operators wrote their own division directors in support of my proposal.

At the subsequent Board of Directors meeting, Frank Fallon reworked the proposal to make non-CW digital signals count as a separate "band." He then worked with the other board members to win approval for this change. Shortly after the meeting, I received word from Don Haney, then Vice Director for New England, that indeed the proposal had been passed.

I'd like to thank Frank Fallon, Don Haney, the rest of the ARRL Board of Directors, the ARRL staff and those RTTY operators who wrote letters for their assistance and support in bringing Field Day RTTY to the forefront. Further thanks go to all who participated in Field Day on RTTY this year. It was, in my opinion, a rousing success. I expect we will see activity grow in the years ahead. Please be sure to send a note to your elected ARRL officials expressing your support for the digital enhancement to the rules.

BOOK REVIEWS

THE 1998 SUPER FREQUENCY LIST (4th Ed.)

1998 GUIDE TO UTILITY RADIO STATIONS (16th Ed.)

RADIO DATA CODE MANUAL (16th Ed.)

by Joerg Klingenfuss, Tuebingen, Germany

Joerg Klingenfuss's books have become a set of "must-reference" books for all data mode listeners. These new offerings are particularly interesting.

1. *The 1998 Super Frequency List* is on CD ROM and includes just about all the broadcast and utility radio stations you can imagine. The windows format is written in both English and German. This is very easy to use and view. (DM 60 surface; DM 65 air mail)

2. *The 1998 Guide to Utility Radio Stations* is a full 1 inch thick! It lists stations and frequencies you probably never even knew were there. What is a "Utility Station"? -- Just about any station that isn't a broadcast station and isn't an amateur station - about 77% of what you hear on HF. This includes government stations, ship stations, coast stations, commercial users, and so on. It also includes SSB voice, CW, FAX, and a whole bunch of different HF data modes that are used throughout the world. The information is presented first in frequency order in Chapter 3 and then in alphabetical order by country in Chapter 4. The last 3rd of the book is devoted to tables, and information you always wondered where to find. Chapter 10 has detailed descriptions and even spectrograms of various digital data transmissions. (DM 80 surface; DM 95 air mail)

3. *The Radio Data Code Manual* is a collection of everything you ever wanted to know about different data codes, protocols, languages, and uses. Chapter 18 presents "Non-standard teleprinter systems" - everything from CLOVER to Piccolo to ITA2 Chinese to third shift Cyrillic to 3rd shift 6-element Japanese. Morse code

for various languages is detailed in Chapter 21. This 1 1/2" thick book contains a treasure-trove of information for those who want to expand their knowledge beyond Baudot and ASCII data coding. (DM 80 surface; DM 95 air mail)

All of these books and more can be ordered from:

Klingenfuss Publications
Hagenloher Str. 14
D-72070 Tuebingen, GERMANY
Phone: 49 7071 62830
FAX: 49 7071 600849
email: klingenfuss@compuserve.com

Prices are in German DM. Joerg accepts American Express, Eurocard, Mastercard, or VISA - as well as money orders or cash (DM only).

SPARKS and FLAMES

IGNITION in ENGINES - An Historical Approach

by Crawford MacKeand, WA3ZKZ

Yes, I know, this is a magazine about RTTY - and - I am as about as fanatic about modems, RTTY circuits, and teleprinters and such stuff as I can get. But, in the humble opinion of *this* engineer, here is one of those treasures filled with little tid-bits of information we will all enjoy browsing through. Crawford's drawings and text are definitely nostalgic trips for us "steam-RTTY" types. Internal combustion machines have been around a *long* time - since the 1660's, in fact. Some very clever and definitely strange-looking mechanical marvels have been built. Our lawn-mower engines didn't just happen - it was a long and convoluted process of evolution with many fascinating detours along the way. No, Crawford doesn't show any teleprinter machine applications. But, I bet one of those large flywheel beauties in Chapter 2 would have run my Model 15 (without the brush noise, too). This is a great little book. See the Tyndar Press ad below to order.

CLASSIFIED ADS

First 30 words \$7.50, additional words 10 cents each. Ads must be pre-paid by check or money order in U.S. funds drawn on U.S. banks only. Visa and Master Card credit cards are accepted. Deadlines: 5/25, 7/27, 9/19, 1/18

PRICE BLOWOUT \$19.95. Adapter to use PK232 as a terminal unit with BMK-MULTY software (see our separate ad) for improved performance on all modes. Any version PK232; MBX board not required. While supplies last; this price is far below our cost. Shipping \$3.00.

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FOR SALE: SNAPmax by WA3ZKZ for RTTY propagation. Allows for HF noise and high latitude effects. \$20 ppd. Book also available "Sparks and Flames", a unique history of gas engine ignition! \$17.95 ppd. TYNDAR PRESS, P.O. Box 236, Montchanin, DE 19710

FOR SALE: Teletype ® Repair Parts - Models 14 to 40. Also Radio tubes and sockets. SASE for list. TYPETRONICS, P.O. Box 8873, Ft. Lauderdale, FL 33310-8873 Ph. (305) 583-1340 or Fax (954) 583-0777. Contact Fred Schmidt, N4TT

FOR SALE: Two Terminal Units / Demodulators. Both have been used with BMK-MULTY software, and include manuals and shipping: (1) Frederick Model 1632A Demodulator. Very sophisticated and unusual unit with two independent demodulators, each with selectable mark and space filter frequencies and bandwidths. All set up for dual diversity reception if desired. I am told this unit cost \$18,000.00 new. Call for details. \$500.00 or best offer. (2) HAL ST-6000 terminal unit. Oscilloscope tuning indicator. Low tones (but still works fine in U.S.) \$130.00. (3) Also have a KAM "modem" with Pactor EPROM. Like new. \$100.00. Call Steve Schnedler AC4IW. (828) 274-4646 evenings.

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- > WPX RTTY Contest
- > BARTG RTTY
- > EA WW RTTY
- > SP DX RTTY
- > ANARTS WW RTTY
- > ARI International
- > VOLTA RTTY
- > ARRL Field Day
- > NA QSO Party
- > Russian WW RTTY
- > SARTG Contest
- > CQWW RTTY
- > WAEDC RTTY
- > JARTS RTTY
- > TARA Sprint
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- > Plus DxPedition Mode

- Advanced callsign detection algorithms**
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No additives

Hardware? Best around ...

- > HAL P38
- > HAL PCI-4000
- > HAL PCI-3000
- > HAL ST-8000
- > HAL DSP 4100
- > PK-232
- > PK-900
- > AEA Generic
- > K6STI "Ritty"
- > K6STI "Bitty"
- > MFJ-1278
- > Kantronics KAM Allmode
- > Kantronics UTU
- > SCS PTC
- > Timewave DSP-599ZX
- > AMT-1
- > ALL "old-style" terminal units (e.g. HD3030, IRL1000, etc)

- Internet:**
 - Mailing list
 - WWW site
- Many, many more features, call, write, or e-mail for full details**

Radio control? Yep!

- > All Kenwood Models
- > Most ICOM Models
- > TenTec
- > Yaesu
 - ✓ FT-1000D
 - ✓ FT-1000MP
 - ✓ FT-990
 - ✓ FT-920
 - ✓ FT-900
 - ✓ FT-890

Computing Power?

- > 386/16 or faster, Pentium class CPU is not required, but will work, of course!
- > 2 MB Ram or more
- > Com1-8, any IRQ
- > DOS, Win 3.1, Win95, Win98

- Complete Reports**
- Beam headings**
- Networking**
- Real Time Rates**
- Real Time Scoring**

Ordering Information:

New Users: The software is \$49.95, including a printed manual (DX add \$5.00 for shipping). Upgrades: For users of Vs. 3, the upgrade cost is only \$15. For Vs. 2.5 and earlier users, the upgrade cost is \$25, including a printed manual. Personal checks drawn on U.S. banks only.



WYVERN TECHNOLOGY, INC.

35 Colvintown Road

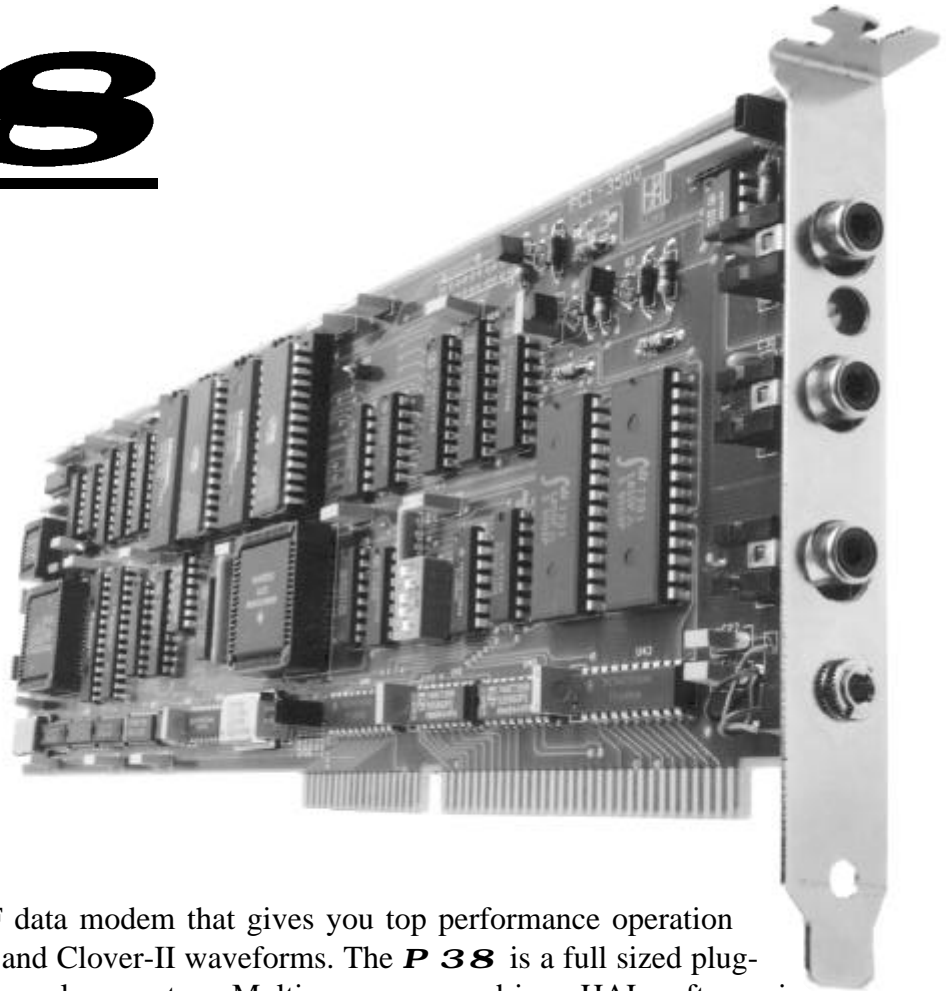
Coventry, RI 02816-8509

Phone: 401-822-7889 FAX: 401-822-0554

e-mail: Sales@wf1b.com www.wf1b.com



P38



The **P 38** is a multi-mode HF data modem that gives you top performance operation using RTTY, AMTOR, P-Mode* and Clover-II waveforms. The **P 38** is a full sized plug-in card for PC-AT and faster personal computers. Multi-screen menu-driven HAL software is included with each **P 38** modem. Many popular "third-party" user programs are also available for the **P 38** - WORLI, WINLINK, WriteLog, XPWARE, EZTERM and RTTY by WF1B. The **P 38** is complete and ready to run. Plug-in the board, connect three phono cables to your radio, and install the software. That's all there is to it! Whether you want to rag-chew, chase DX, or access electronic mail, the **P 38** is the modem of choice.

SPECIFICATIONS

DATA MODES: CLOVER-II

Data	8-bit, transparent
Wave form	4-tones, 2250 Hz center
Bandwidth	500 Hz @ -50 dB
Symbol Rate	31.25 per second
ARQ Mode Modulation	BPSM, QPSM, and 8PSM
FEC Mode Modulation	2DPSM, BPSM, QPSM, and 8PSM
Error Correction Coding	Reed-Solomon code: 60, 75, or 90% Code Rate
ARQ Protocol	2-level, multiblock auto adaptive
Adaptive Mode Control	Measure S/N & Phase on all data; set TX mode
ARQ Thru-put	8 to 35 bytes/sec.
FEC Thru-put	4 to 25 bytes/sec.

FSK MODES:

RTTY Codes	Baudot and ASCII
Baudot Rates	45, 50, 57, 75 Bd
ASCII Rates	75, 110 Bd
RTTY Tones	1275/1445 or 2125/2295 Hz
AMTOR Code	CCIR-476 & CCIR-625
AMTOR Modes	ARQ or FEC
AMTOR Tones	1275/1445 or 2125/2295 Hz
AMTOR Rate	100 Baud
P-Mode* Modes	Auto-ARQ & FEC
P-Mode* Tones	2100/2300 Hz
P-Mode* Rates	100/200 Baud

*The word "P-Mode" is the HAL designation for a communications protocol that may be also known as "Factor" a registered trademark of the Spezielle Communications System GmbH (SCS) firm in Hanau, Germany. HAL affirms that, to the best of its knowledge, "P-Mode" is compatible and interoperable with the protocol SCS calls "Factor" and with the link establishment and weak signal modes of the protocol SCS calls "Factor-II".



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