# Fifty Years of RTTY

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**WS7I at W1AW during the fall 2002 CQ/RJ WW RTTY DX contest.**

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## RTTY Contest Schedule — Spring 2003

| Date & Time | Contest | Date & Time | Contest | Contest Information Online |
|---|---|---|---|---|
| 03/02 2200 to | **Open Ukraine** | 04/06 1600 to | **EA WW** | ARRL: http://www.arrl.org |
| 03/03     0159 | **RTTY** | 04/07     1600 | | Jim's Gazette: http://www.n2hos.com/digital |
| | | | | LA9HW Contest Calendar: http://home.online.no/~janalme/hammain.html |
| 03/09 0000 to | **NCJ Sprint** | 04/26 1200 to | **SP RTTY** | SM3CER Contest Service: http://www.sk3bg.se/contest |
| 03/09     0400 | | 04/27     1200 | | The New RTTY Journal: http://www.rttyjournal.com/contests |
| 03/15 0200 to | **BARTG** | 05/04 2000 to | **ARI RTTY** | |
| 03/17     0200 | **Spring HF** | 05/05     1959 | | 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 three weeks for processing and delivery. |

Dates and times subject to change.

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# Hits & Misses

**Bill Henry, K9GWT**
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This issue includes the last of Dale Sinner's excellent RTTY Tuning Scope articles. This time around, Dale modifies an old SB610 to be a tuned-filter RTTY scope. This design uses vacuum tubes (the things that glow and get hot). It was a nice retro project for Dale and for me. In the course of helping Dale with his tuning scope projects, I dug out all of my old RTTY scopes and CRT collection. As you can see from the photos on Page 8, I have accumulated quite a pile of "good stuff" (a.k.a. boat anchors).

On page 11, we have a frank discussion from Jay, WS7I, about the do's and don't of submitting logs when using the Cabrillo software tools. If you work contests, there is a lot of information to be gained from Jay's comments.

Also please note the inside story about HP1XVH on Contadora Island on page 15 and all about the new President of JARTS, Taka Nagata, JA1JDD (page 14). And, I have put-together a collection of information about RS-232 connections starting on page 12 — stuff you've no doubt seen before but probably can't recall where.

The annual Dayton gathering is on us again and Jay Townsend, WS7I, and Betsy Townsend, WV7Y will be running the show for us this year. Preliminary information and the map are shown on Page 9. Might as well call Jay and Betsey now, make your reservation, and be sure you haven't forgotten it.

As you have noticed, this issue of the New RTTY Journal is very late — about 3 months late, in fact. 2002 was not a kind year and the delay in publication is the result of my lack of time and application. Family illnesses consumed most of our time and moving to a new house turned out to be a LOT more work and stress than we had expected. With the start of 2003, it is our hope and intention that these problems and delays are now behind us.

We are facing another problem which also leads to delays in publication. We need materials to publish. As time goes on, I am receiving less and less articles to print. You've probably noticed that the NRJ has included an increasing number of article authored by Dale and myself. Both of us like to write and enjoy the chance to "spout off". BUT — maybe you'd like to read about someone else's opinions and interests? Maybe you have had enough tuning indicator articles? Dale is getting tired of making them — and we are both running out of junk box parts for CRT's, HV power supplies, and so on. How about writing a short piece of two for your magazine. It need not be a technical article. How about some news about working the contest — problems YOU have had? How about a biography about someone you know who is or has been a major influence in RTTY? Maybe you need to send me your own words — just in self-defense?

73 until next issue (soon)

de Bill, K9GWT



www.rttyjournal.com/dayton

*Your RTTY link to Dayton 2003.*

# Tube RTTY Scope Two Tone Tuner

## Dale Sinner, W6IWO
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As promised here is the second in my series of RTTY tuners. This tuner is old fashioned in that it uses two 12AX7s for the amplifier stages. My task was made easy when Wayne Matlock, K7WM, volunteered his working SB-610 scope for the project. After looking over the scope carefully, I decided to use a number of parts from this old scope. The power transformer, CRT (3RP1), 1 meg pots, the intensity control, fuse holder and miscellaneous other parts were all removed but saved. The rest of the scope was cannibalized down to the chassis. The original schematic drawing called for the same transformers used in the transistorized scope project, so this had to be changed to accommodate the SB-610 transformer. So again I asked Bill Henry, K9GWT, for his help in redesigning the scope circuit. The final result is shown in Photo #1. The schematic diagram of the tube scope is shown in Fig. 1.

I decided to use the two tube socket openings behind the power transformer as they were close together (see Photo #2). Using these two sockets made for a clean and neat wiring arrangement. I then installed all the electronics on a small piece of perf board. I cut out two holes under where the tubes were and using one inch stand-offs, installed the electronics as shown in Photo 3. This made it possible to have the electronics and the tube sockets all in one package. When finished, the tube sockets were installed on the chassis thus providing ground. I also mounted several terminal strips to this perf board for easy connection of wires. These wires went to the CRT, horizontal and vertical position controls, and the horizontal and vertical gain controls. The two 2N3904 transistors were also mounted on this board. Two terminal strips were used for the filament voltages to the CRT and the 12AX7s. The resistor and capacitor network is installed on the board and is fed by the plus 300 volt and minus 12 volt supplies. It is a very busy little board but all the parts fit quite easily. Remember when wiring the 12AX7s they each have two filaments. Pins 4 and 5 must be tied together for one leg while pin 9 is the other. Once all the components are installed on the board and the power supply is built, 12 volts can be sup-

plied so measurements can be taken for this part of the circuit. Follow the voltages listed on the schematic to be sure you have everything wired correctly.

The next task was to build the power supply board. This schematic is shown in Fig. 2 and the perf board parts layout I used is shown in Fig. 4. The end result of this circuit gave me plus and minus 12 volts DC, plus 312 volts DC, and minus 916 volts DC. You will note I again used the 7812 and 7912 regulators in the 12 volt supplies. These two voltages are not only used for the scope circuit but are also used for the input filter where the voltages need to be a little more precise. There is nothing special about this circuit and the finished product can be seen in Photo 3. For those who do not have a transformer, the circuit of the power supply for the transistorized scope will do just fine (see Spring 2002 issue). I would suggest using the same cabinet I used in the previous article. For those who do not have a 3RP1, I have included the wiring for the 3BP1 (Fig. 3). The 3EP1 will also work but be sure to check the pin outs for this tube. In the Spring 2002 issue of the NRJ there is also a circuit for an alternate power supply for use with the 2AP1 tube. Referring again to the Summer article, using a shield around the CRT is necessary and ideas are given in that article.

Now we come to the Filter board. The circuit is shown in Fig. 5. This is the corrected filter circuit. We found an error in the previous one and an errata sheet was included with the Summer issue which covered the corrections. Again, it is up to you how narrow you want this filter to be. If you prefer the narrower filter then you must change R7 and R8 to a larger value of resistance (try 301K). I have included a board layout to make the component location easier (Fig. 6). The plus and minus 12 volts were wired in last and can be done on either side of the board. I did mine on the back side and it doesn't look very sanitary but works fine. Once the filter board is wired, a Mark and Space source will be needed. I used the output from the DXP38 which made it easy for me since the HAL Windows software has a provision for sending either mark, space, or both. To adjust the center frequency of each filter, it is necessary to input these two tones. There is also a balance circuit that must also be adjusted first. To do this, disconnect all audio input to the filter and short the AF-IN to ground. Connect a DC voltmeter to pin 1 of U1a (1st op amp), and adjust for zero volts at pin 1. This is a a touchy adjustment and the voltage will swing rapidly from +12 to -12 volts. Just set R 18 as close to the zero point as possible.



**Photo #1**

Once the filter is set up you are ready to install the board on the chassis. I have included a picture of the lower chassis area to show the location of the components (Photo 3). Note where the different voltages are connected and where I located the terminal strips. After having done all these things, you are ready for the smoke test. If you do it right the first time, then you should see tones on the screen of the CRT. Check all the controls to be sure you are getting activity.

If you do not have a trace on the CRT, here is a check you can make which will determine if the CRT circuit is working. Tie all the deflection leads together and connect them to the wiper of Astig control. You should see a dot on the screen. If this does not work, then disconnect two plates and try, then the other two plates. If this does not work, disconnect two plates and try, then the other two plates. This will tell you if one side is working. Also check all the voltages as they are shown on the schematic. You should be able to obtain readings fairly close to those suggested on the schematic. Be sure to be careful in making any of these checks. Always turn off the scope or pull the plug which is much safer.

Several pictures have been included to give you a better idea of how I went about building this RTTY tuner. This project will be in service at Wayne's QTH for the upcoming JARTS contest.
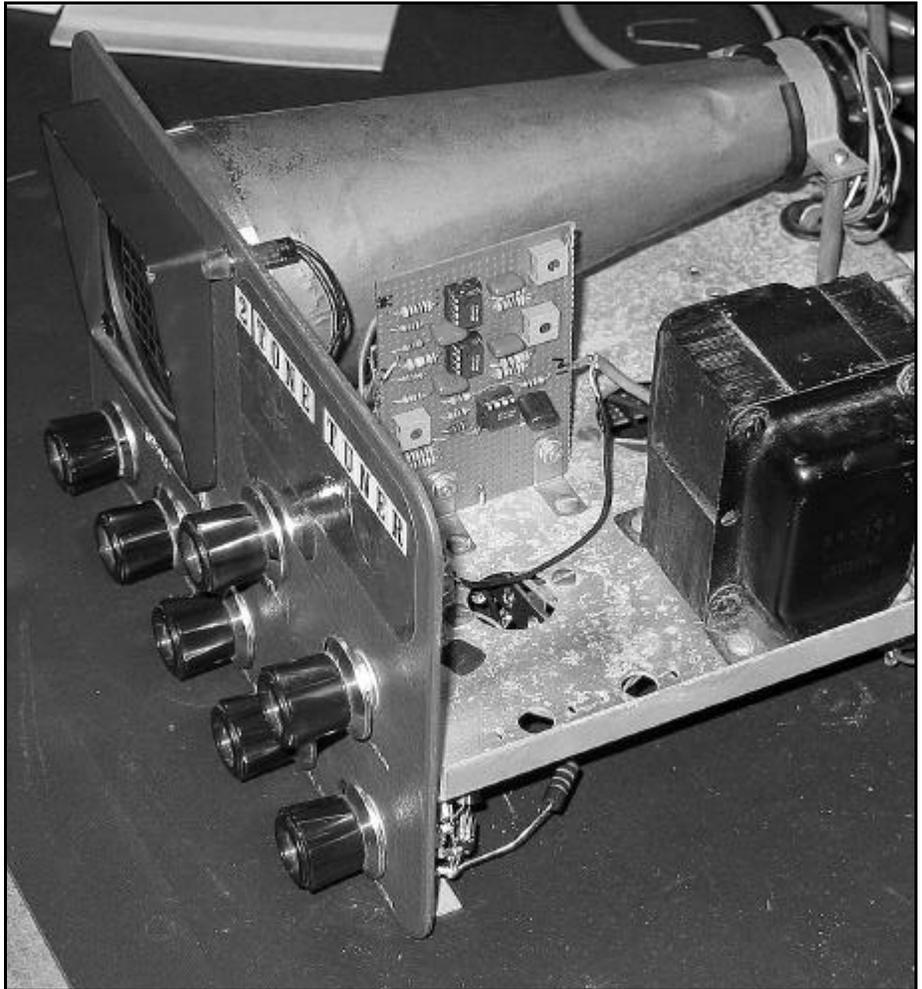
— 73 de Dale Sinner, W6IWO



**Photo #2**
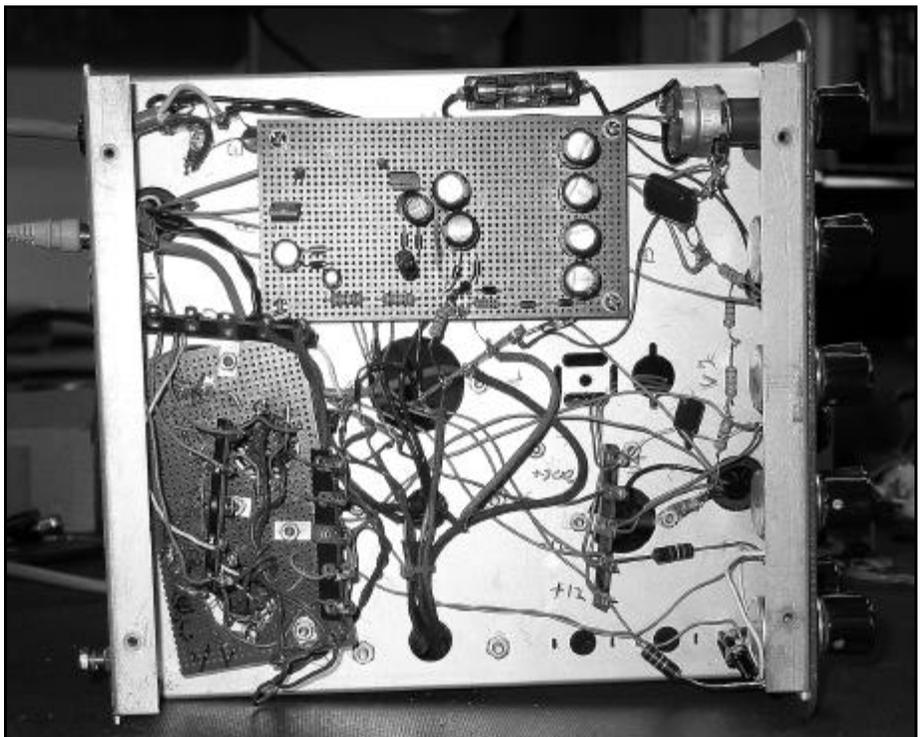
**Photo #3**

**Fig. 1**



**Fig. 2**

**Fig. 3**



**Fig. 4**

NOTE: Components D3, D4, & D6 not used.



* Change these resistors
to change bandwidth.
Incr. R to narrow CRT ellipses
Decr. R to widen CRT ellipses

**Fig. 5**



Note: +12V Conects to pin 8 of U1, U2, and U3
-12V Conects to pin 4 of U1, U2, and U3
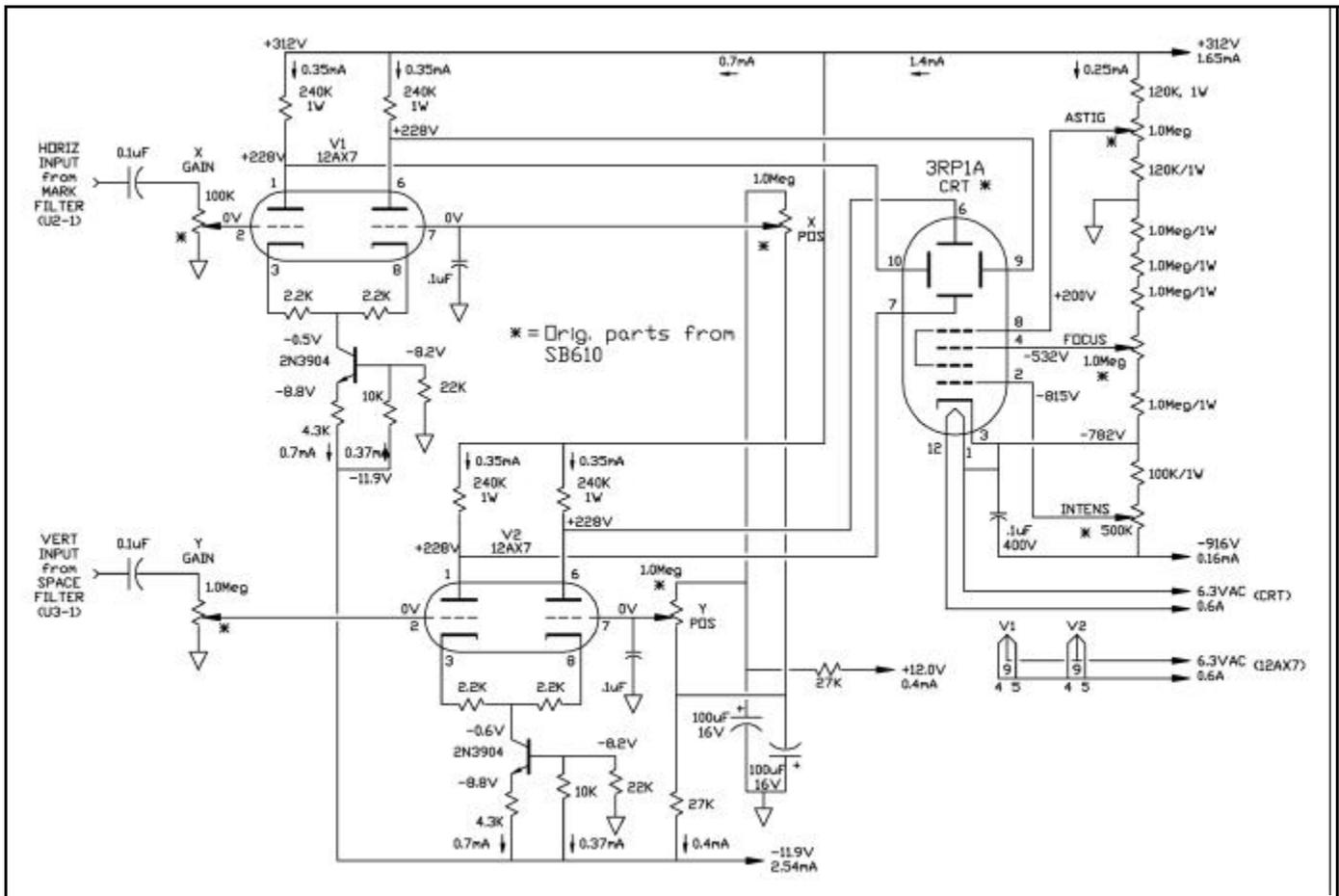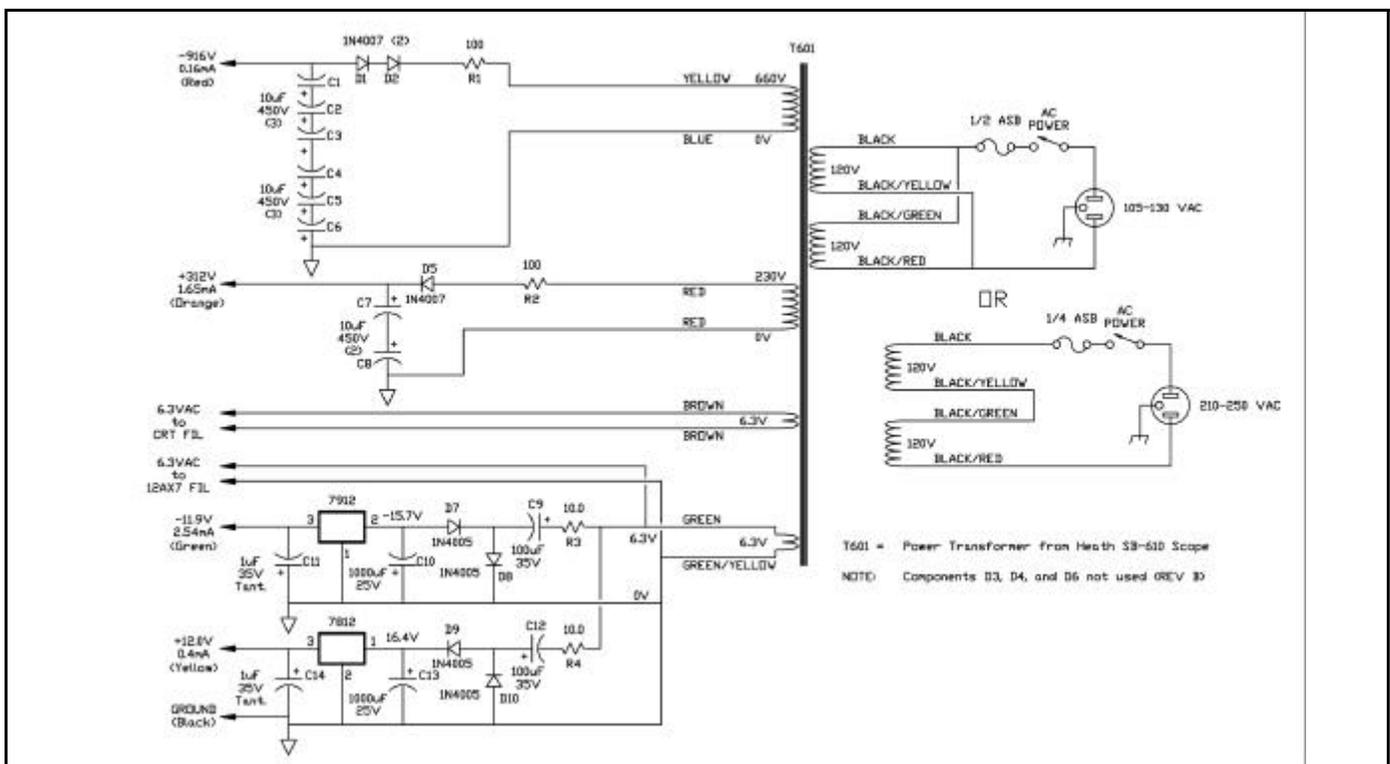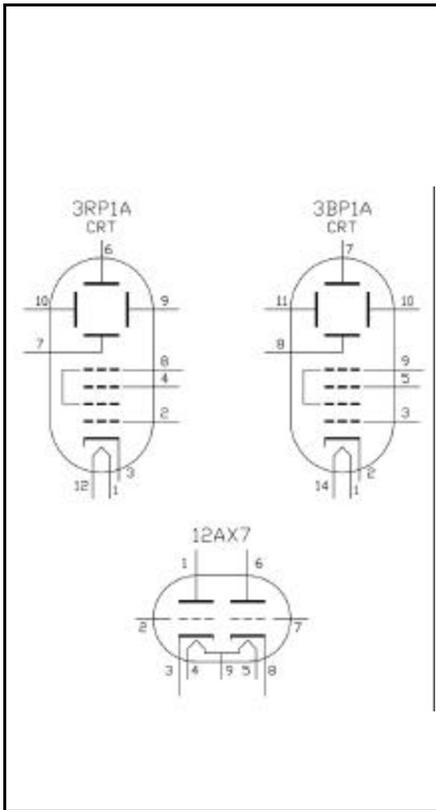
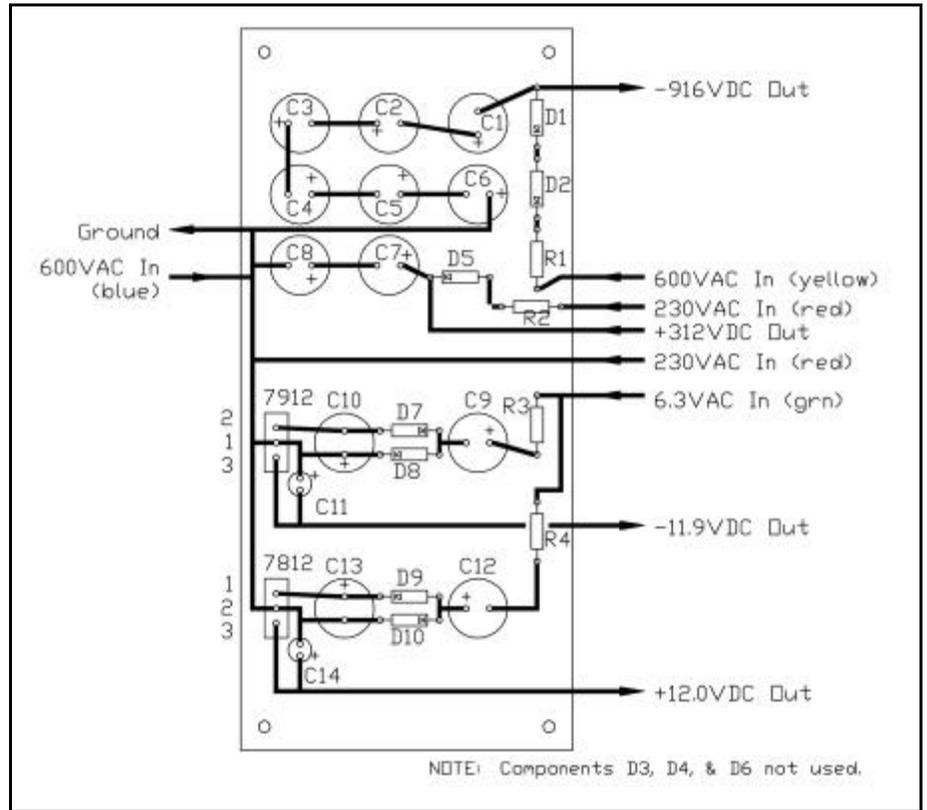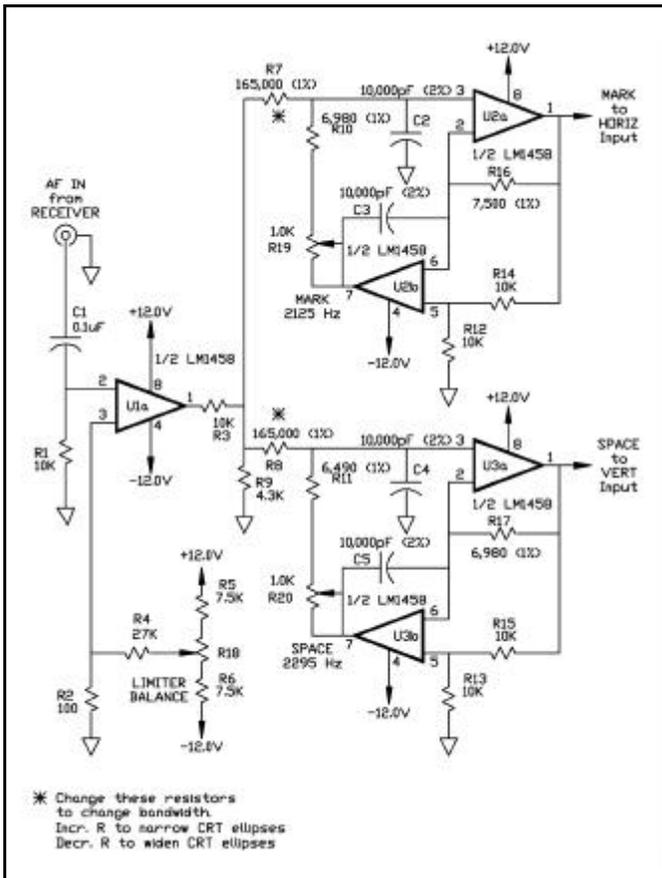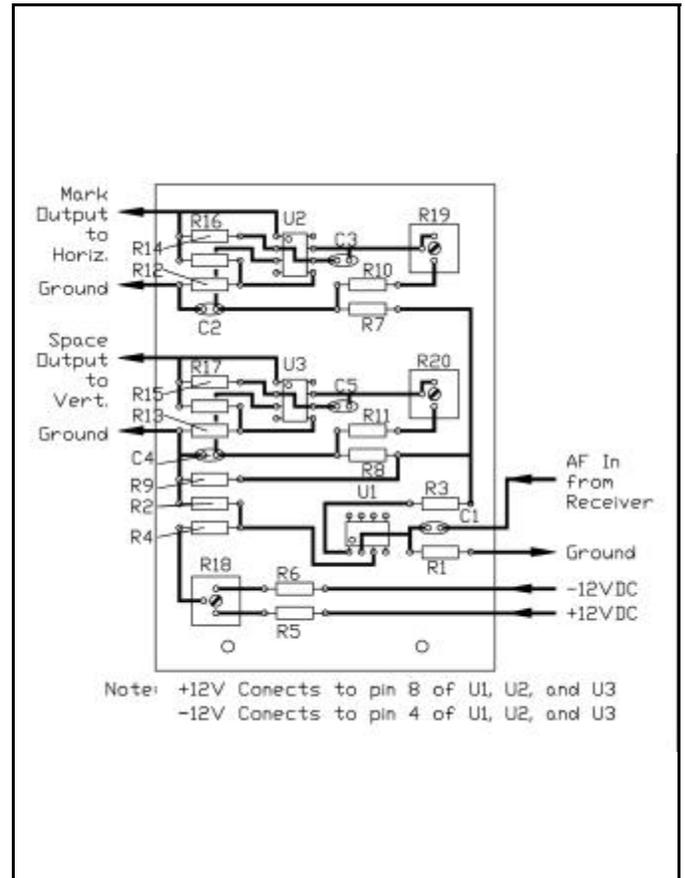**Fig. 6**

# Scope Stuff at the K9GWT QTH



The photo shows a collection of RTTY scopes, tuning indicators and associated modems I have worked with over the years. Starting at the left and from top to bottom:

**LEFT:**
HAL RTTY-1 RTTY-Tune (1998) (LED Bar Graphs)
HAL SPT-2 Spectra-Tune (for PCI-3000) (1990) (LED Bar Graph)
HAL SPT-1 Spectra-Tune (for PCI-2000) (1986) (LED Bar Graph)
HAL RS-2100 RTTY Scope (for CT2100) (1982) (D3-14GH CRT)
W6IWO 2-Tone-Tuner (Dale Sinner) (2002) (3RP1 CRT)

**CENTER:**
HAL ST-7000 Packet Demodulator (1988) (LED Bar Graphs)
HAL Telereader CRI-200 Computer RTTY Interface (1983) (LED Dot Matrix)

HAL DXP-38 HF DSP Modem (1999) (LED Bar Graphs)
HAL ST-6000 FSK Demodulator (1976) (D3-14GH CRT)
Dovetron MPC-1000C RTTY Terminal Unit (1974) (2AP1 CRT)
HAL ST-8000 HF Modem (1985) (D7-233GH CRT)

**RIGHT:**
James Millen Co. 90911 Miniature Oscilloscope (1950) (1CP1 CRT)
Navy OS-8C/U Oscilloscope (1956) (3RP1 CRT)
Telereader SC-1 LED Tuning Indicator (1982) (LED Dot Matrix)
James Millen Co. 90903 Oscilloscope (1950) (3KP1 CRT)

Some people collect stamps. I collect boat anchors?



The photo shows an evolution of the Cathode Ray Tube (CRT). Starting at the left:

**1" Tubes:**
RCA 913 — 1" Dia. in a metal shell — very rare (circa pre-1940)
RCA 1EP1 — 1" Dia. (circa 1962)
Telefunken D3-14GH — 1" Dia. (circa 1980)

**2" Tubes:**
National Union (JAN) 902P1 — 2" Dia. (circa pre-1940)
Ken-Rad (JAN) 2AP1 — 2" Dia. (circa 1940)
General Atronics (JAN) 2BP1 — 2" Dia. (circa 1945)
Telefunken D7-233GH — 2.125" x 1.875" (circa 1998)

**3" Tubes:**
RCA (JAN) 1806P1 (3EP1) — 3" Dia — rare (circa pre-1940)
Dumont (JAN) 3RP1 — 3" Dia. (circa 1945)
National Union (JAN) 3BP1 — 3" Dia (circa 1945)
Telefunken D12-101GH — 3.375" x 2.875" (circa 1998)

Rectangular tubes (D7-233GH and D12-101GH) have "trace rotation" coils around the neck. Run a small DC current through them to rotate the trace and correct for slight misalignment between the CRT deflection plates and rectangular face. A round CRT doesn't need this coil — you just turn the tube to get it straight!

# Dayton 2003

## Hotel and Dinner Reservations

Reserve your room early to make sure you don't miss out on this year's RTTY events. A reservation form is enclosed in this issue; please use it to reserve rooms and optional seats for the RTTY Journal dinner. If you need more forms, a PDF file is available at our website (www.rttyjournal.com) that you can download and print out. Jay and Betsy Townsend are handling both the hotel and dinner arrangements this year. Please make sure you send this form to the Townsends, not to the hotel or the RTTY Journal.

## The Hotel

The RTTY Group will be staying at the same hotel as last year. It is the Howard Johnson at 7575 Poe Avenue, Dayton, OH 45414. It is much closer to Hara Arena than the previous hotel. The rooms are $85.00 per night. Although the hotel does not have a restaurant, it does offer a free continental breakfast, and there are many restaurants nearby. Below is a map of the hotel's location.

## RTTY Journal Dinner

The RTTY Journal will host the only dinner this year. It will be on Saturday the 17th, and the cost per person is $19.00. Use the form mentioned above to make your reservation, and be sure to take a look at the menu and schedule on our website. Dress however you like, but we will be taking pictures!

## Contact

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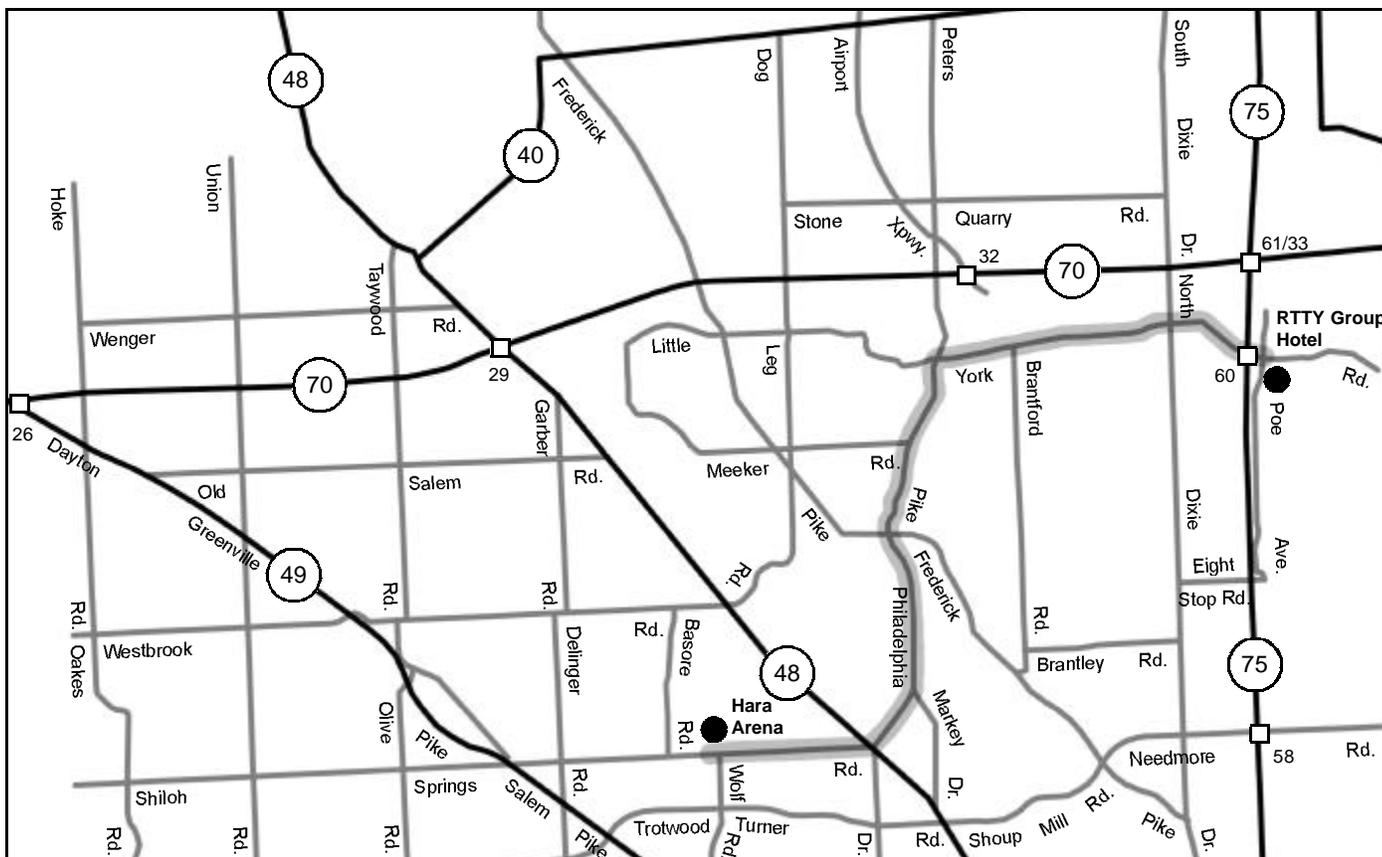
**Taka Nagata, JA1JDD**

Yasutaka (Taka) Nagata, JA1JDD, has been named president of JARTS. He replaces Gin, JA1ACB, a world famous DXer. Gin has decided to completely retire and all wish him many happy days in the future. Taka takes up this new position and I'm proud that he is a good friend of mine. Here is some background.

Taka was born March 27, 1940 and became interested in ham radio while attending junior high school. In 1959 he obtained his license and was active in SSB for three years or more before other demands forced him to drop out of ham radio for about ten years. Upon his return he again pursued 6 meter SSB for about two years and then became interested in RTTY. He was active on RTTY for many years starting in 1978. But, business demands again forced him to slow up his activities in ham radio however, but never far from his mind. In 1992 JARTS was founded and Taka was one of the founding fathers. Gin, JA1ACB, was chosen as the leader of this organization and has remained president until now.

Taka graduated from university and went to work for NNT for two years. From there he went to TEAC and began a life long career. He was in charge of R&D for many years and was the design engineer of magnetic tape handlers for small computers. In 1975 he left R&D and became manager of overseas sales support group. This meant many trips to the USA. Taka learned English with help of RTTY but is really self taught. His many trips to the states have resulted in friendships that

will last him forever, including Bob, W0HAH; Bill, W0LHS; and many others. His travels took him to Europe and Asia many times chalking up some 300,000 airline miles. All this made it possible for him and his wife to travel at times together.

Taka and his wife have three children, all of which are grown and on their own. There is one daughter and two sons. His number one son and wife made him a grandfather just recently. Taka, like many of us, has other hobbies. They are motorcycling, badminton, and ice hockey. At one time he had a collection of five motorcycles. One was a touring model which he still has and the others were different types such as sand buggy, off-road, and American. Now he only keeps the touring model. He is quite active with a junior hockey team where he plays the position of goalie.

There is no doubt in my mind that Taka will make an excellent president of JARTS. He has been to my home on many occasions and we have had some wonderful visits.



## 2002 Hamfair — JARTS

**Dale Sinner, W6IWO**
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On August 24 and 25 2002, Japan ham radio held it's annual Ham Fair. This year's the event was in Tokyo and upwards of 28,000 hams attended. Our friends in RTTY the JARTS group had a booth and demonstrated the age old mechanical machines. From the pictures included with this article you will note the famous Kleinschmidt machines. Taka Nagata, JA1JDD, the new president of JARTS was on hand at the booth along with other RTTYers. Taka says many stopped by to listen to the machines and smell the oil. Some of those were people who worked in the commercial field enjoyed the aroma and noise. Hi! There was even some RTTY art shown and it appeared to be some of our famous Don Royer, WA6PIR (SK) wonderful pinups.

Taka related that JARTS has about 200 members and about 40 stopped by the booth. JARTS unveiled their new banner at this show, which was designed by Fumio, JA1IQV. JARTS is to be congratulated for giving many Japanese hams exposure to RTTY. They do have a big presence on the ham bands and it is said more is better.

## *Up-to-date Contest Information*



www.rttyjournal.com/contests

# Logging in the 21st Century

**Jay Townsend, WS7I**
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Here is what I had to do with some recent NAQP RTTY Log's and here is what you should have done prior to sending in your log. Maybe these little pointers will help before the next contest logs are due.

Most RTTY contests are now scored using Cabrillo Tools by WT4I. Bruce, WT4I is a long time RTTY contest winner and the creator of the tool box. Some contest programs automatically create a "cabrillo log" for you out of the normal log data. An example of this is Writelog for Windows. Some, like WF1B don't have this feature and you are on your own. You can of course buy a copy of Cabrillo Tools which will help you with your cabrillo log preparation.

You can not even begin to imagine what a lot of work doing 170 logs entails. But to think of the many 100's that make up CQWW RTTY is beyond my insight. This was a first time "log checking" with Cabrillo Tools for me. It does much more efficient log checking than using the old method, but it is still a lot of work.

Here are some of the things I found while doing the NAQP logs: First of all, RTTY contests are RTTY, not mixed or SSB or CW. Low power contests are Low power — they aren't high power. If you used High Power you need to indicate that in the log. If the contest check has to guess it's a checklog. Your NAME is that name sent in the exchange. If you send Jay you don't put Jay Townsend in the Cabrillo file. That results in a score of zero.

If you are in Montana then you need to make sure for a CQWW RTTY contest that it indicates that you are in Zone 4. RST, Zone, and State/Location is the exchange. They need to be in the log. Look at your cabrillo file or contest file and make sure that things are correct.

Yes, I do think that Cabrillo could be improved. It should check the received zones against the sent zones and not guess which end did the correct job. You should log what's received, but currently I don't think this is the case. In fact I know its not. Hopefully, Bruce, WT4I, will improve his tools to

include this as he has done with the name for the NAQP RTTY.

Make sure the log is your log. If you have someone help then get the file and double check it. Don't assume that it is right. Open up notepad and take a good hard look at what you are sending to the log checker. Yes, I agree that if a log has a huge log reduction then perhaps there is a log problem. But, in most cases it's up to you to double check. Don't depend on the log checker to do the job for you. He may or may not, as there are often deadlines in this stuff. For example the NAQP results had to be done and at the printer two months before the magazine came out.

People often ask about "massaging" the data after the contest. I have no answer on that, but you must make sure it's at least what you want to have your score based on.

3830 HCS. I would VERY HIGHLY recommend that you submit your score at some point to the 3830 reflector. It is useful to log checkers in making sure that the email system didn't eat your submission. We had email problems in the RTTY NAQP and it ensured that we got most of the log's. If you are sensitive to score issues then lie some in your HCS, rather than not sending it in to the reflector.

The correctness of your log is on your shoulders and not on the shoulders of the person that is in all cases a volunteer who is just trying to help.

Here are some more examples from the NAQP, names of 599, sections not states. The NAQP is a bit different from some contests as we convert WF1B logs to Cabrillo. That means that the log checker has to decide what the Name, State, and call is from what is submitted. Then the checker has to add all the header stuff and get it right to make your sorts. I used Excel to sort. If I have a SSB entry then it messes everything up.

Another example from NAQP was the European high power logs, should I just arbitrary decide that since they are high power to

make them check logs or should I just change them to low power? Actually I didn't really care so I made 'em low power. Being the assistant manager of the contest gave me some flexibility.

The Cabrillo file format shows the exchange you are supposed to have sent. If for some unknown reason you fill in that field incorrectly, but your RTTY messages are programmed to send what you should have been sending, how is the log checking software to know? You sent "BIGTOM" as your name, but your birth certificate says Tom. When you filled in the NAME field, you thought it meant your birth-given name, not the exchange you sent. So now your Cabrillo log file says Tom instead of BIGTOM. What is the log checking software supposed to do other than score your log as zero points because the exchange you sent was not copied by anyone in the contest?

Cabrillo is good software, but only as "smart" as the information you give it. It is just a formatted record of each exchange you send and receive during a contest. The log checking software takes the Cabrillo log at face value. That's why contest entrants must check their logs *before* mailing them to the contest sponsor.

# RS-232 Connectors and All That Stuff

**Bill Henry, K9GWT**
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This article falls in the category of "I know that — but — I can't recall where I saw it or the details". All of us have heard of RS-232 and no doubt hooked up some cables — probably made one or two. Here's a reminder about what is what.

## Standards

The RS-232 standard dates from 30 plus years ago. It started out as "RS-232", then "RS-232A", etc. Now we have "TIA/EIA 232F". You can buy a copy of the complete standard from the TIA/EIA for $68 — *if* you want to know *all* the details. However, here is a summary of what I think applies to RTTY in 2003. Even though the "new" name is "TIA/EIA 232F", I will from here on call it by the generic name we all know — simply "RS-232".

## Which End is Which?

The RS-232 data standard considers two general types of data equipment. The first type is a gadget that is a "data terminal" — like a Teletype, PC, CRT terminal, etc. The RS-232 standard calls this the Data *Terminal* Equipment, or DTE. The other type is called the Data *Communications* Equipment — DCE. A modem is a DCE device. The distinction determines which pins are connected for transmit and receive data, which device originates or receives control signals, and the sex of the data connector used.

## Connectors, Pins, Sockets, and Shells

The original RS-232 specification devoted itself entirely to the data signals and how they were used. The exact connector used and the pin arrangement was *not* defined. By industry use, we all soon started to use the DB25 series of connectors but there were still problems about which shell style to use and whether our gadget had pins or sockets for each wire.

The DB25 connector originated in the 50s and 60s. The "D" stands for the "D-Subminiature" family of connectors. This was one of the first aero-space connectors and

it offered an extreme degree of flexibility. The "B" in the part number stands for the shell size. Finally, "25" specifies the total number of pins. Common usage has assumed that the connector *family* is "DB" — not so. Our 25-pin RS-232 connector is a DB-25. But, the 9-pin serial I/O connector often used on laptops is a DE-9 and *not* a DB-9. The "E" indicates the smaller "E" shell size is used. Other shell sizes are "A" (15 pins), "C" (37 pins), and "D" (50 pins). To add further to the confusion, this assumes use of standard density pin inserts. There is also a high density pin arrangement — and that's how we get 15 pins in the "E" shell size — today's standard video connector on a PC. Long story short — we really use a DE-9 connector and *not* a DB-25. But, popular use has called it a DB-25 for so long that the distinction is blurred. Use whichever label feels best for you.

## RS-232 DE-9 Connections
### DCE = Modem, DTE = PC

| # | Signal | ID | DCE | DTE | Signal Levels |
|---|--------|-----|--------|--------|---------------|
| 1 | Data Carrier Detect | DCD | Output | Input | ON = +V, OFF = -V |
| 2 | Receive Data | RXD | Output | Input | Mark = -V, Space = +V |
| 3 | Transmit Data | TXD | Input | Output | Mark = -V, Space = +V |
| 4 | Data Terminal Ready | DTR | Input | Output | ON = +V, OFF = -V |
| 5 | Signal Ground | SG | - | - | Ground return for signals |
| 6 | Data Set Ready | DSR | Output | Input | ON = +V, OFF = -V |
| 7 | Request to Send | RTS | Input | Output | ON = +V, OFF = -V |
| 8 | Clear to Send | CTS | Output | Input | ON = +V, OFF = -V |
| 9 | Ring Indicator | RI | Output | Input | Ring - +V |

## RS-232 DB-25 Connections
### DCE = Modem, DTE = PC

| # | Signal | ID | DCE | DTE | Signal Levels |
|---|--------|-----|--------|--------|---------------|
| 1 | Frame Ground | FG | - | - | Ground return for shielding |
| 2 | Transmit Data | TXD | Input | Output | Mark = -V, Space = +V |
| 3 | Receive Data | RXD | Output | Input | Mark = -V, Space = +V |
| 4 | Request to Send | RTS | Input | Output | ON = +V, OFF = -V |
| 5 | Clear to Send | CTS | Output | Input | ON = +V, OFF = -V |
| 6 | Data Set Ready | DSR | Output | Input | ON = +V, OFF = -V |
| 7 | Signal Ground | SG | - | - | Ground return for signals |
| 8 | Data Carrier Detect | DCD | Output | Input | ON = +V, OFF = -V |
| 9 | Positive DC Test Voltage | +V | Output | - | Low I output on some DCE |
| 10 | Negative DC Test Voltage | -V | Output | - | Low I output on some DCE |
| 11 | Printer Busy | Busy | Input | Output | ON = +V, OFF = -V |
| 12 | Secondary DCD | SDCD | Output | Input | ON = +V, OFF = -V |
| 13 | Secondary CTS | SCTS | Output | Input | ON = +V, OFF = -V |
| 14 | Secondary TXD | STXD | Input | Output | Mark = -V, Space = +V |
| 15 | Transmit Clock | TXC | Output | Input | Output on rising edge |
| 16 | Secondary RXD | SRXD | Output | Input | Mark = -v, Space = +V |
| 17 | Receiver Clock | RXC | Output | Input | Input on falling edge |
| 18 | Local Loopback Enable | LL | Input | Output | ON = +V, OFF = -V |
| 19 | Secondary RTS | SRTS | Input | Output | ON = +V, OFF = -V |
| 20 | Data Terminal Ready | DTR | Input | Output | ON = +V, OFF = -V |
| 21 | Remote Loopback | RL | Input | Output | ON = +V, OFF = -V |
| 22 | Ring Indicator | RI | Output | Input | Ring - +V |
| 23 | Rate Indicator | CI | Output | Input | High rate = +V |
| 24 | External TXC | ETXC | Input | Output | Output on rising edge |
| 25 | Test Mode | TM | Output | Input | ON = +V, OFF = -V |

Notes: Pins 9 and 10 provide very low power DC sources on some DCE devices. Pin 11 not assigned by RS-232D; used as printer busy flow control by some printers. Per RS-232D — pin 12 may alternatively be used for CI (pin 23 above). Some modems use pin 25 for a "busy out" signal; busy = +V.

### Which Pin Does What?

Here again, we have an "almost agreement" on use. The table on page 12 shows the pin assignment for RS-232 on a DB-25 connector and on a DE-9 connector. All RS-232 DB-25s have TXD on pin 2, RXD on pin 3, and ground on pin 7. That's all you need if you use software flow-control (aka XON/XOFF). Most serial ports also support CTS, RTS, DSR, DCD, and DTR on the pins indicated. But, after that, you had better check the manual! This is particularly true of the secondary port connections — SRXD, STXD, SCTS, SRTS, SDCD, and SDSR. Most DB-25 RS-232 connectors do *not* support a second serial port connection. Also, few devices provide the clock signals. You may find "special" signals on many of these pins. The DE-9 standard has fewer pins to worry about and it came later in time. Its pinout is pretty standard except for pin 9 — "RI" is often not supported.

### What Shell and Pin Combination Go Where?

Here, it took some time to get standardized. But, the modern rules for *both* DB-25 and DE-9 connectors are as shown in Figure 1.

**Voltage Levels:** RS-232 uses bipolar voltages, "-V" and "+V" as shown in the tables. The "-V" range is -3V to -25V, a "Mark" data state or "OFF" control signal state. The "+V" range is +3V to +25V, a "Space" data state or "ON" control signal state. Note that voltages between -3V and +3V are in the "transition region" and NOT DEFINED. In other words, a 0V / +5V digital signal is NOT compatible with RS-232 specifications. Sometimes you see this done and under good conditions it may just work fine with short cables and low-noise environments. But, it's risky business to just grab a TTL signal and assume you can pass it though an RS-232 connection. All RS-232 receivers are supposed to be rated for up to -25V or +25V maximum. However, most RS-232 circuits these days use -12V/ +12V or even -5V/+5V. There is NOT a maximum RS-232 cable length specification but wire-to-wire capacitance of low cost cables limits practical lengths to maybe 10 or 20 ft. "No longer than absolutely necessary" is a good rule particularly if your system includes a radio transmitter and/or a sensitive receiver. The longer the cable, the more likely it is that you will have RFI/EMI problems.

**Specifications:** The current standard is "ANSI/TIA-232-F-1997". This publication is



**Fig. 1**

Data Terminal Equipment (DTE = PC)

DB-25P
Pins (male)
Female shell

DE-9P
Pins (male)
Female shell

Data Communications Equipment (DCE = Modem)

DB-25S
Sockets (female)
Male shell

DE-9S
Sockets (female)
Male shell

Pin numbers are as viewed from the OUTSIDE of the equipment

available from the "Telecommunications Industry Association" via "Techstreet" (www.techstreet.com — $68.00 plus shipping). The 9-pin connector standards are discussed in "ANSI/EIA/TIA-574-1990".

**Cabling:** Three different cabling scenarios are diagrammed in Figure 2. The most common is the "Standard PC to Modem" cable. This just requires a 25-wire DB-25 or 9-wire DE-9 cable. The wires are connected pin-to-pin — pin 1 to pin 1, etc. The cable ends have opposite sex connectors — DB-25P on one end and DB-25S on the other (or DE-9P and DE-9S). Things get a little more complicated when you want to connect two terminals — aka PCs — back-to back. In this case, you need DB-25S (or DE9S) connectors on each

end. And, the TXD signal from one PC needs to drive the RXD input to the other PC. So, you must cross-wire RXD and TXD to be able to send data back and forth. Likewise, flow-control usually requires that RTS and CTS be cross-wired. BUT — sometimes, you may NOT want to interconnect CTS and RTS — like in a situation that uses XON/XOFF flow control. The DSR, DTR, and DSD signals are usually jumpered together at each terminal to satisfy communications software that may require one or more of these signals to operate. Finally, we often run into the situation that our PC has a DE-9 connector but the modem has a DB-25 connector — or vice-versa. Special adapters are available that make this RS-232 conversion. The most common internal connections are shown in Figure

2. However, beware that some 9-to-25 and 25-to-9 adapters may NOT include all of these connections. I have several adapters that do NOT interconnect DCD, DSR, CTS, and RI. These adapters work only if the terminal software does not require these signals. If in doubt, get out your ohm-meter and find out what's hooked to what!

Finally, Jay Townsend suggests that I show "standard" DE-9 sound card connections that are frequently used to provide FSK RTTY, CW KEY and TX/RX PTT signals. See Figure 3 for this information and an example opto-isolator circuit you may want to use. There are many variations on this circuit so use whatever best fits your application.
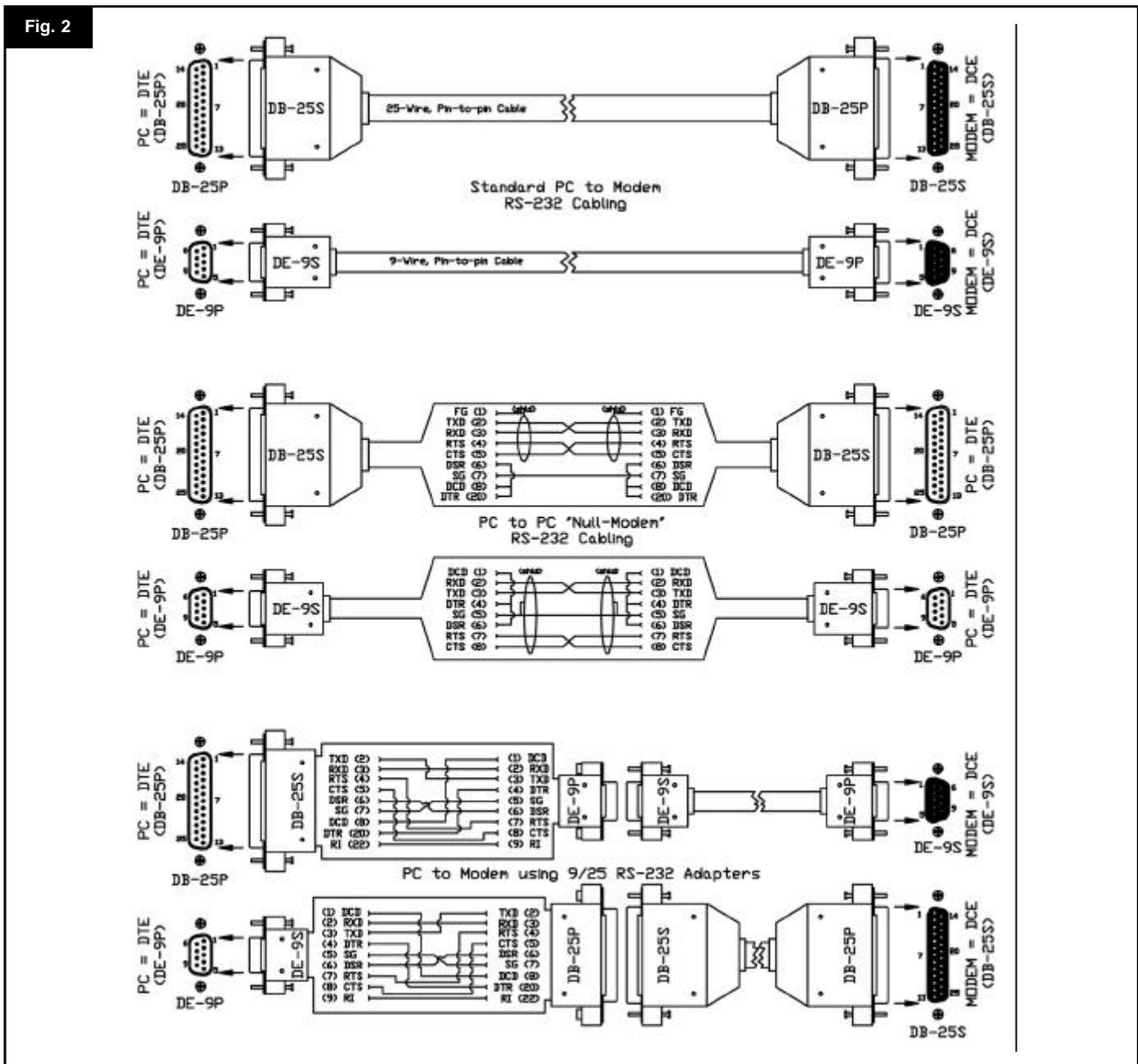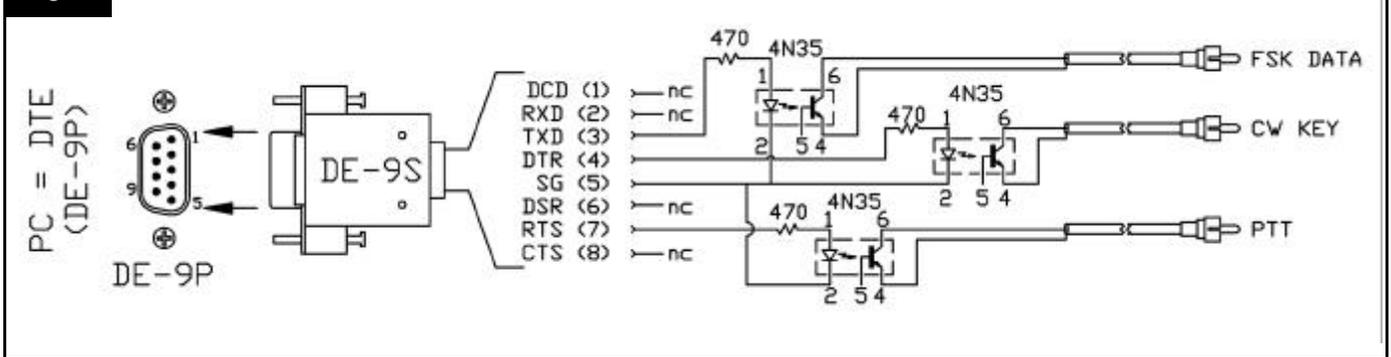
**Fig. 2**

# HP1XVH
# Contadora Island

**Guenter S. Hamacher**

contadora@gmx.de

Since almost ten years there are a lot of hams from around the world like from the United States, Slovenia, Columbia, Venezuela, Japan, and Germany who are visiting my station on the island of Contadora in the Pearl Island group in the Pacific.

Every year some of them are participating with me in CQWW events and become crazy about the good conditions and the never-ending pile-ups from this exotic location.

The result is that every year around 25,000 to 30,000 contacts are made from here and that my QSL manager John, N0JT, from the 247 DX group gets thousands of QSL cards and also grey hairs from time to time.

About 12,000 of these contacts are done every year in the CQWW and for three years we have kept a special eye on the CQ/RJ World Wide DX Contest.

The preparation for this RTTY contest takes a lot of energy — setup — and a lot of modern equipment, good monobanders on three towers and beverage antennas almost one mile long.

During the contest we work with two 1.5KW stations; an FT1000D combined with an ACOM 2000, and a TS870DSP combined with an Alpha 87. Most of the antennas are from Force 12, like the 14 el. C31XR and 80m 2 el. monobander. An additional station with a TS2000, 5 el. Titanex and beverage antennas, is used to look for multipliers on other bands and for watching the openings of other bands during the contest.

Three PTC-IIs from SCS, four IBM networked PCs, a well-functioning WriteLog program, and a 48-hour cluster connection to the small Island Contadora are our setup for the contests.

No German beer or rum is permitted during the contest, just coffee and Coca-Cola. Hi.

**2000 CQ/RJ World Wide DX Contest**

With the special call HO1A, we started our first contest in this category as MS/HP/3 ops. Lightning damaged our PC system, we blew up several bandpass filters, and some cluster crashes were only some of the jocks (?) during this first contest in RTTY.

We got second place in the world, and by our surprise, we had broken the North America record set in 1999 by 37%. Our official score: "HO1A, North America Winner with 5,257,224 points and New North American Record", says the nice trophy from CQ and the RTTY Journal.

One of the funniest contests we ever did from Contadora Island in the Gulf of Panama. Funny in two cases:

1. From the government of Panama we got this time the very short special call H8A for our contests in 2002. Permission to use this call from September 8 to November 30, 2002. One hour and forty-seven minutes before the contest, we got a FAX from the President of Liga Panamenia de Radio Aficionados (LPRA), Mr. Ivanovich Serrano, HP1DLQ, stating that our permission to use the call had

been revoked two days earlier. No explanation why, nothing. We had to change our t-shirts in a hurry and also change the WriteLog setup on all four PCs.

2. In the eyes of CQ/RJ, in June 2002, we were already the winner of the September 2002 contest. In June 2002, we got two nice trophies. One for 2001 and the other for "2002 World Winner". There must be a guru working for CQ/RJ who realized in June that we would be the world winners three months later.
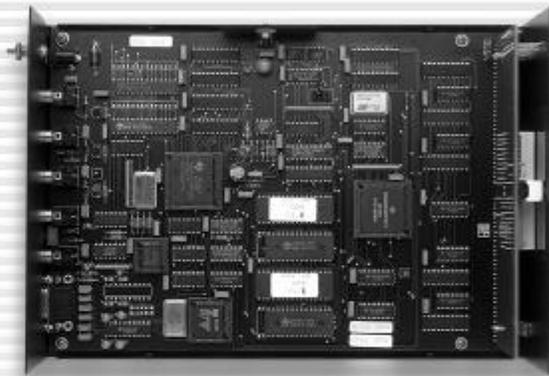
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