DIGITAL HAPPENINGS #21

(April 2014)

By W0NAC ("Matt")

It's very gratifying to see new people joining in the fun and challenge of operating digital. New to digital are the mobile team of KG5UZ/KJ5PQ (Mike & Cheryl) who have been putting out many counties all over Texas on 3-4 digital modes. Also new this month is KC3X (Hollis) who just got his fixed station set up for digital ops and is now "going great guns!". Also heard during April on digital were WB0TEV (Paul) who put out several TX counties on RTTY, KW1DX (Dave) in ME, and WY7FD (Dwayne – Not a County Hunter) on RTTY in Crook, WY.

Then, there was that monumental trip just completed by N6PDB/WA6OCV (Dennis & Susan) where they drove their RV all the way from CA to GA and back to CA putting out close to 250 counties on 3 – 4 digital modes. Their trip was a real boon to many county hunters and filled a lot of holes for the **USA – Digital Award** and the **5 – Mode award**! They deserve many kudos from all of us for their unselfish efforts on our behalf! Dennis reports that he and Susan had a great time on the trip and were especially grateful to N1API, W4YDY, K5GE, and WB2ABD for sticking with them throughout the entire trip making sure that they completed Master Platinum transmitted counties and 3 new modes in all 250 counties.

Sharon and I are planning a trip through Alaska on the way to the National Convention in July. While there, we hope to put out all 4 Judicial Districts on SSB, CW and at least 4 Digital Modes. If our plans work out OK, we will publish the details for the trip on the K3IMC site and by email.

Now, on to the main topic for this month.

Compatibility Issues When Making RTTY Contacts:

First Some History

RTTY is the 2nd oldest digital mode in use today (the oldest is CW). Landline teleprinter operation began in 1849 between Philadelphia and New York City. In 1874, a man named Emile Baudot designed the five unit code (Baudot code) that is still in use today. Radioteletype (RTTY) was first successfully tested by the Navy between an airplane and a ground station in 1922. Commercial RTTY systems were in active service between San Francisco and Honolulu as early as 1932. The US Military used RTTY from the 1930's and expanded this usage during World War II. Almost all of these RTTY systems used mechanical teleprinters until the 1980's when they were replaced by computers running teleprinter emulation software.

Amateur use of RTTY began after World War II when obsolete, but usable Teletype Model 26 equipment became available from commercial operators. The first two-way amateur radioteletype QSO of record took place in May 1946 between W2AUF and W2BFD. The first RTTY contest ("RTTY

Sweepstakes Contest") took place in November 1953. The ARRL started issuing WAC RTTY certificates in 1969 and DXCC RTTY Awards in 1976. Today, many RTTY enthusiasts have moved on to more modern digital modes (like PSK and MFSK), but many hams and DXpeditions still use RTTY today. Also, there are many RTTY contests throughout the year. For county hunters, RTTY contests can be an excellent source of new counties for the **USA – Digital Award** and new modes for the **5 – Mode Award**. By the way, if you have never heard a RTTY signal, click on the following and download the file to your desktop: https://dl.dropboxusercontent.com/u/26171574/RTTY.ogg . Once the file "RTTY.ogg" is on your desktop, just run it to listen.

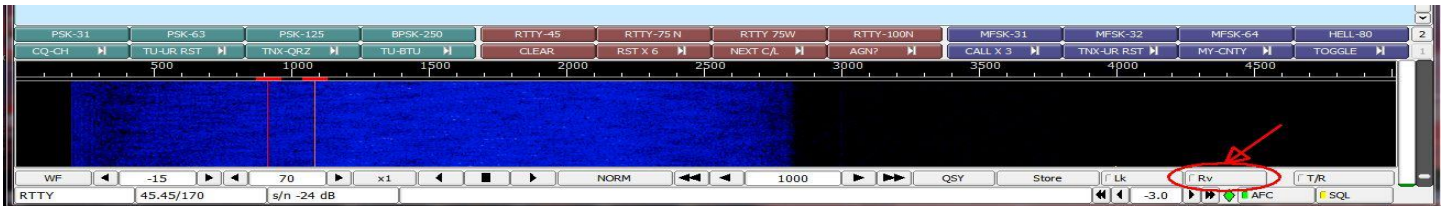
RTTY Signal characteristics:

A RTTY signal begins with a series of ON ("Mark") and OFF ("Space") pulses which represent the various letters, numbers, and control characters in the 5 bit Baudot code. Unlike the 8 bit ASCII code which can code 256 characters, the 5-bit Baudot code can only be used to represent 26 characters plus 6 control codes. One of these control characters ("FIGS") is used before a string of text to allow a 2nd set of 26 characters (10 numbers plus 16 punctuation marks). Another control code ("LTRS") is used to shift back to the first set.

These ON and OFF pulses are then used to either directly modulate the frequency of an RF carrier or to modulate the frequency of an audio tone which is injected into the pass band of a transmitter configured for USB or LSB. The direct method is called FSK (Frequency Shift Keying) and the second is called AFSK (Audio Frequency Shift Keying). Some purists believe FSK is the only way to go, but both methods produce identical signals if used correctly. It should be noted, however, that AFSK is subject to being over-driven if the input audio signal is too strong (just like PSK) and will produce a distorted signal if driven into non-linear operation.

What is Polarity?

Here is where it can get confusing! In FSK there are two frequencies, conventionally called "Mark" and "Space". In amateur RTTY, the mark frequency is (by convention) the higher of the two RF frequencies and RTTY signals are transmitted on LSB. If you transmit with the opposite polarity, you are said to be transmitting "upside down". If the person receiving your signal has his software set for normal polarity, your signal will show as gibberish on his screen. To solve this problem, either the sender has to reverse the polarity of their transmitted signal or the receiver has to reverse their receive polarity. If you are using FSK you can usually control the transmit and receive polarity independently, but when using AFSK software (like Fldigi), both transmit and receive polarity change at the same time. If you are decoding gibberish from another RTTY signal, you can quickly test for them being upside down by clicking on the "Rv" button at the bottom right of the screen (below).



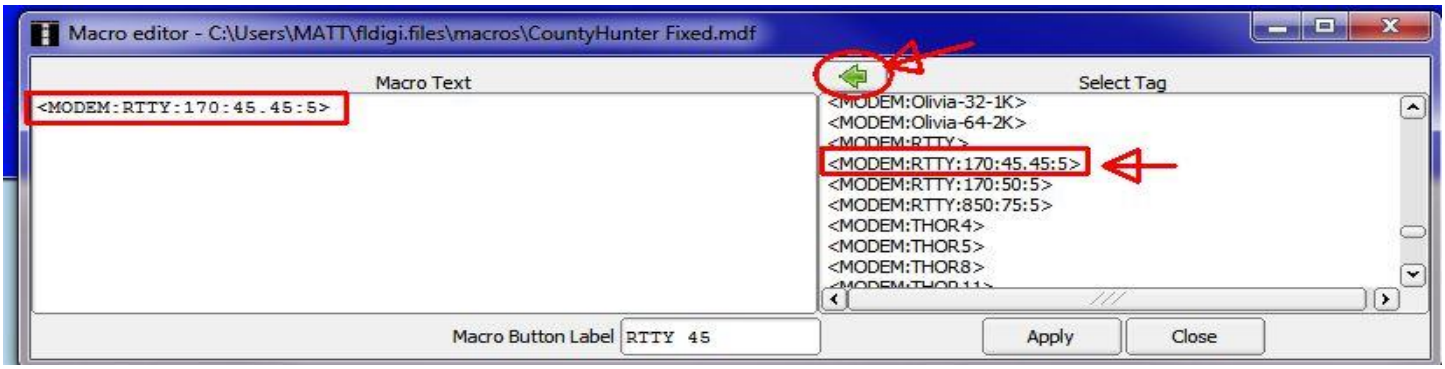
The “Rv” button toggles between two states - the normal (unreversed) as shown above and reversed (not shown) with the light ON at the left end of the button.

Fldigi handles default polarity a bit differently. First, the operator must set his transceiver to USB for all digital modes including RTTY. The Fldigi software then sets the transmit and receive polarities so that they are correct for other amateur signals using LSB. Naturally, the polarities are also correct for other people using Fldigi on USB. What this means is that you can use the default settings for Fldigi to both work RTTY contests (where most are probably transmitting on LSB) and mobile county hunters who are also using Fldigi on USB.

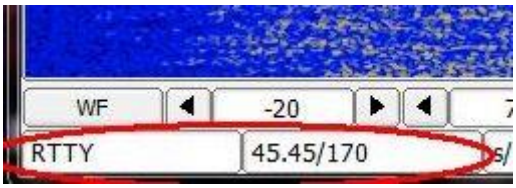
Fldigi Error:

An earlier release of Fldigi contained an error which caused improper configuration of the RTTY-45 mode when using the RTTY-45 MODEM Tag in a Macro Text. A message was sent to my digital list, but I need to repeat the cure for this problem here for anyone I may have missed. Simply stated, you need to:

1) Be sure you have updated to the latest version of Fldigi (Version 3.21.81 or later). You can get it from the following link: http://www.w1hkj.com/download.html .
2) If you have any macro files with macro buttons that select the RTTY-45 mode, you need to update the Macro Text for that macro button using the Modem Tag from the latest version of Fldigi as shown below:



Pull up the Macro Editor by right clicking on the macro button you wish to edit, and then delete everything in the left box (Macro Text). Then scroll down in the Select Tag box until you see the Tag indicated and select it with a left click. Next, left click on the left pointing arrow at the top to move the Tag into the Macro Text box. Finally, click on “Apply”, then “Close”, and test your modified macro button by left clicking on it. You should see exactly the following near the lower left corner of your screen:



You need to repeat this process for every macro file that has a RTTY-45 macro button.

The updated Table 3 is given below:

Table 3 - Active Digital County Hunters Award Status

#	CALL	NAME	STATUS* (M,F,I)	USA - DIGITAL COUNTIES (of 3077)	(1 MODE)	(2 MODES)	FIVE MODE COUNTIES (3 MODES)	(4 MODES)	(5 MODES)	TOTAL	% 5-Mode Completed	LAST UPDATED
1	AA8R	Randy	F	1206	3077	3077	1320	381	31	7886	51.3%	3/18/2014
2	AC0B	Cliff	F	205	-	-	-	-	-	0	0.0%	12/10/2012
3	AD1C	Jim	F	-	-	-	-	-	-	0	0.0%	
4	K0DEQ	Bill	F	-	-	-	-	-	-	0	0.0%	
5	K0FG	Fred	F	188	3077	3013	187	20	6	6303	41.0%	4/14/2014
6	K0PVW	Rob	F	-	-	-	-	-	-	0	0.0%	
7	K0WJ	Lou	F	-	-	-	-	-	-	0	0.0%	
8	K4PBX	Jim	F	151	2889	133	19	9	8	3058	19.9%	2/26/2014
9	K5GE	Gene	F	26	1893	575	8	0	0	2476	16.1%	5/26/2013
10	K5SF	Dick	F	-	-	-	-	-	-	0	0.0%	
11	K5WAF	Bill	F	599	3044	?	?	?	?	3044	19.8%	5/2/2013
12	K7REL	Tom	F	-	-	-	-	-	-	0	0.0%	
13	K8QWY	Ed	F	-	-	-	-	-	-	0	0.0%	
14	K8ZZ	Ed	F	-	-	-	-	-	-	0	0.0%	
15	KA4RRU	Mike	M/F	975	3077	2939	944	49	1	7010	45.6%	1/10/2014
16	KA8JQP	Pamela	M/F	22	202	64	53	28	4	351	2.3%	9/12/2013
17	KC3X	Hollis	F	-	-	-	-	-	-	0	0.0%	
18	KC6AWX	Bob	F	450	3077	1592	264	59	14	5006	32.5%	5/7/2013
19	KC7YE	Jack	F	-	-	-	-	-	-	0	0.0%	
20	KD5YUK	Billy	F	-	-	-	-	-	-	0	0.0%	
21	KD7KST	Bill	M/F	1792	-	-	-	-	-	0	0.0%	9/30/2012
22	KF7PKL	Davis	F	379	879	211	48	15	1	1154	7.5%	10/9/2013
23	KG5RJ	Greg	F	704	3050	2121	643	268	104	6186	40.2%	4/27/2014
24	KM1C	Bill	F	-	-	-	-	-	-	0	0.0%	
25	KU4YM	Dave	F	86	2841	83	40	8	2	2974	19.3%	4/23/2014
26	KM6HB	Mark	F	714	3077	2936	694	87	1	6795	44.2%	2/3/2013
27	KW1DX	Dave	M/F	68	3077	991	65	50	24	4207	27.3%	4/26/2014
28	N0KV	Barry	M/F	500	3077	3029	2289	355	69	8819	57.3%	1/7/2014
29	N0LXJ	Sharon	M/F	1373	3077	2271	1231	504	257	7340	47.7%	4/26/2014
30	N1API	Al	F	701	3077	2213	631	404	271	6596	42.9%	4/24/2014
31	N4JT	Jim	F	736	3077	3064	743	235	150	7269	47.2%	10/21/2013
32	N5MLP	Ron	M/F	391	3077	409	54	37	9	3586	23.3%	5/19/2013
33	N6PDB	Dennis	M/F	889	3077	2902	1104	783	626	8492	55.2%	4/27/2014
34	N8CIJ	Dick	F	676	3077	3014	668	303	229	7291	47.4%	9/5/2013
35	N8HAM	Jim	F	0	3077	0	0	0	0	3077	20.0%	4/2/2013
36	N9WNN	Steve	F	0	2180	0	0	0	0	2180	14.2%	2/24/2013
37	NA8W	Darl	F/M	579	3022	852	381	212	99	4566	29.7%	9/12/2013
38	NF0N	Mike	F	900	3077	3077	1091	283	127	7655	49.8%	4/18/2014
39	NN9K	Pete	F	816	3077	859	78	1	0	4015	26.1%	3/23/2012
40	NT2A	Gene	F	-	-	-	-	-	-	0	0.0%	
41	NU4C	Paul	F	-	-	-	-	-	-	0	0.0%	
42	NW6S	Jim	F	722	3077	3077	743	59	35	6991	45.4%	9/7/2013
43	NX4W	Lloyd	M/F	1185	3077	1327	493	338	103	5338	34.7%	4/26/2014
44	W0NAC	Matt	M/F	1843	3077	2849	2018	1138	490	9572	62.2%	4/26/2014
45	W3DLM	Don	F	359	3077	2390	298	101	55	5921	38.5%	10/12/2013
46	W3ZUH	Dick	F	5	3077	2048	11	2	0	5138	33.4%	12/4/2013
47	W4IHI	Gary	F	-	-	-	-	-	-	0	0.0%	
48	W4SIG	Kerry	F	-	-	-	-	-	-	0	0.0%	
49	W4YDY	Dave	F	1000	3077	3077	1149	495	300	8098	52.6%	4/22/2014
50	W5QP	Rick	M/F	332	3077	2691	358	203	166	6495	42.2%	4/21/2014
51	W6RK	Risto	F	-	-	-	-	-		0	0.0%	
52	W6RLL	Joe	F	-	-	-	-	-	-	0	0.0%	
53	W7FEN	Larry	F	25	3077	2975	32	1	0	6085	39.6%	10/3/2013
54	W7IN	Larry	F	-	-	-	-	-	-	0	0.0%	
55	W7QQ	Bill	M/F	-	-	-	-	-	-	0	0.0%	
56	W9JR	Rich	F	90	3077	1674	44	0	0	4795	31.2%	10/31/2012
57	W9SUQ	Larry	F	-	-	-	-	-	-	0	0.0%	
58	WA4EEZ	Leslie	F	1086	3077	1742	699	234	31	5783	37.6%	1/6/2014
59	WA4UNS	Doug	F	-	-	-	-	-	-	0	0.0%	
60	WA6OCV	Susan	M/F	328	3077	328	320	130	10	3865	25.1%	3/28/2013
61	WA7ETH	Ed	F	173	1919	389	30	3	0	2341	15.2%	3/25/2014
62	WA7JHQ	Sterling	F	-	-	-	-	-	-	0	0.0%	
63	WB0M	Jeff	F	-	-	-	-	-	-	0	0.0%	
64	WB2ABD	Paul	F	-	-	-	-	-	-	0	0.0%	
65	WD4OIN	Jack	F	1021	3077	3070	1031	453	204	7835	50.9%	4/15/2014
66	WQ7A	Terry	F	201	3077	3028	206	132	112	6555	42.6%	8/24/2013
67	WY4D	Ben	F	281	3077	303	36	15	9	3440	22.4%	2/11/2014

How To Get Your 5 – Mode Statistics Updated:

Several past Digital Happenings articles have given detailed instructions on a new and easy way to update your digital statistics for Table 3 by using a small program called “Digital Report Utility”. This

new program will create a report for you showing your progress for both the **USA – Digital** and the **5 – Mode Awards** and email it to W0NAC. Instead of repeating these instructions every month I have included them in a Microsoft Word document that you can download by clicking on the following link: https://dl.dropboxusercontent.com/u/26171574/Happenings/5%20Mode%20Update.doc

Further comments on RTTY

Most digital county hunters seem to have settled on RTTY-45 as one of the 3 or 4 modes they use when putting out a county or county line. RTTY-45 is certainly the most popular RTTY sub-mode used by amateurs all over the world, but let me suggest that RTTY-45 may not be the best choice for digital county hunting. First, although a 45.45 baud rate is supposed to be the equivalent of 60 WPM (words per minute), in real world tests it comes out closer to 55 WPM. PSK-63 (one of our other popular digital modes) clocks in at almost 70 WPM. After putting out a county using PSK-63, the slower speed of RTTY-45 is definitely noticeable and you find yourself getting a little frustrated at the extra time required.

I recommend that both RTTY-75N and RTTY-75W be given a try by digital mobiles when putting out counties. RTTY-75N takes up about the same bandwidth (180 Hz) as RTTY-45, but clocks out at 85 WPM which will save precious time when putting out a county. RTTY-75W occupies about 860 Hz bandwidth, but it runs at 100 WPM which would save even more time!

Naturally, there is still no “free lunch”. One drawback to using the faster modes may be less ability to copy weak signals. Another is that not all digital software programs are compatible with these sub-modes (Fldigi is totally compatible). However, without further tests, we will never know whether or not the advantages outweigh the disadvantages.

This will be one of the topics discussed at the Digital Meeting at the MARAC National Convention in Visalia, CA. See you there!

Other possible topics for future months include (in no particular order):

“Lesser Well Known Features of Fldigi”
“How to Log Your Digital Contacts in Logger”
“Macros – Revisited”
“New Digital Awards?”
“Digital Software Installation – Revisited”
“Award Difficulty Index”

If anyone has a story or tip that you wish to contribute, I will certainly try to include it. Short stories describing your experiences/joys/frustrations/etc. in getting started in digital ops would be especially

welcome. Summaries of any digital trips you make (or have made in the past) would also be good. I look forward to hearing from you. Don't be shy!

Please email me with your comments/suggestions at w0nac@comcast.net and don't forget to send your updated status for the **USA – Digital** and **5 - Mode Awards** so I can update the Active Digital County Hunters Award Status list again next month.

73's and we hope to see you on our waterfall again real soon!

Matt – W0NAC