DIGITAL HAPPENINGS #1

By W0NAC ("Matt")

This is the first of what will be a series of articles on digital county hunting. My goal is to inform/help both those currently involved and others who may be interested in exploring this new and exciting facet of Ham Radio.

First, I understand that operating digital is not everyone's "cup of tea". Our late MARAC president (Bill Inkrote) once said (I am paraphrasing here) that there are a multitude of different ways to gain personal satisfaction in the hobby of Ham Radio. Just a few examples are Emergency Service (ARES), DX, EME, County Hunting, Contesting, Hardware Design/Building/Testing, etc. The list is practically endless! We county hunters have carved out our own "nitches". Some do only **CW**. Some only work **SSB**. Some like to do Net Control. Some like to operate as a mobile OM/YL team. Others, like Sharon and I (maybe you also?) enjoy exploring the new world of digital operations. There are more than enough ways that each of us can get our "jollies" and I wish everyone the best of success in their choices.

First, we need to define "Digital" and "Digital Modes". Here are my definitions:

"Digital" - Electronic technology that generates, stores, and processes data in terms of two discreet states: positive and non-positive.

"Digital Mode" - A modulation scheme that uses discreet signal characteristics, while an "Analog Mode" is a modulation scheme that uses continuously varying signal characteristics. Note that the signal characteristics might be amplitude, frequency, phase, etc.

It is interesting to note that from the very beginning of County Hunting and Ham Radio, folks have been using one of the digital modes. It is called "**CW**"!

DIGITAL AWARDS

There are two MARAC awards that require the use of digital modes to complete. These are the **USA – Digital Award** and the new **Five Mode Award**. Complete rules for each of these awards are given on the MARAC Web Site (www.marac.org). Just select the "Awards" tab then the "Award Rules" tab to read them. Tracking of both awards is fully supported by the "Logger" software issued by MARAC.

The **USA – Digital Award** has been around for several years now and basically requires that you log a contact with all 3077 counties using any of many digital Modes. Even though **CW** is technically a digital mode, **CW** is specifically excluded from this award so as to not conflict with the existing **USA – CW Award**. Four or five people have completed the first level (1000 Counties) for this award.

The **Five Mode Award** was approved by the MARAC Board at its annual meeting in July 2011. It basically requires that you make 5 contacts with each of the 3077 counties using any mode from an approved list of 33 modes. This list includes both analog modes like **SSB** and **FM** as well as many digital modes like **PSK**, **RTTY**,

HELL, etc. It also includes CW! If someone has finished USACA (SSB or CW) they are at least 20% of the way toward finishing the Five Mode Award since the award does not specify a start date. Also, to make this award a little easier to attain, if at least one end of any contact is mobile, operators on both ends get to count the counties on both ends of the QSO. Again, for complete rules, go to (www.marac.org).

Incidentally, the new 5-Mode Award has numbered awards for working all counties in a state on 5 different modes. Sharon and I have made significant progress toward finishing Colorado. W0NAC has finished 42 of the 64 counties in CO and N0LXJ has finished 38. Since people felt that working all 3077 with 5 modes is so difficult, these state awards were provided to prevent people from getting discouraged while working toward the WBOW. In my opinion, the 5-Band Award is perhaps harder to achieve than the 5-Mode Award, but this remains to be seen. What's important is that each of us pursues the awards that are personally interesting and challenging.

RECENT ACTIVITIES

There is a lot of on-going activity in digital county hunting, but much of it is not very visible. Hopefully, this article will help in this regard. I have given Forums and live on-the-air demonstrations at several conventions. The most recent was at the Michigan Mini. People often ask: "How many people are pursuing either of these digital awards and how far along are they?" "How many mobiles are out there who put out counties using digital modes?"   I will attempt to give partial answers to these questions a little later.

Sharon and I have made numerous trips in the last few years where we have "put out" (as a team) many counties using various digital Modes. Early on we used almost exclusively PSK. After the 5-Mode Award was approved, we started putting out counties (while mobile) on 4 different digital modes including PSK, RTTY, MFSK, and THROB.

Here are 2 summaries of our total activity on the trip to Vancouver, WA and back to Colorado last July:

TOTAL CONTACTS MADE ALL MODES *

MODE	W0NAC	N0LXJ
CW	25	0
FM	105	105
MFSK	100	100
PSK	236	232
RTTY	106	106
SSB	1114	1050
THROB	74	74
TOTALS:	1760	1667

* Numbers Reflect Contacts On County Lines (2 Counties) With Both of Our Calls

W0NAC/N0LXJ TEAM DIGITAL CONTACTS (BY CALL SIGN) *

#	CALL SIGN	PSK	RTTY	MFSK	THROB	(TOTAL)
1	AD1C	0	4	0	0	4
2	K8QW	4	0	0	0	4
3	KC6AWX	4	0	0	0	4
4	KD5YUK	8	8	0	0	16
5	KE4ETY	28	24	0	0	52
6	N4JT	44	44	52	40	180
7	N8CIJ	56	60	76	56	248
8	NA8W	20	20	24	12	76
9	NT2A	28	4	0	0	32
10	NX4W	28	12	16	12	68
11	VA3XOV	8	0	0	0	8
12	W5QP	0	4	0	0	4
13	WA4EEZ	8	0	0	0	8
14	WA4UNS	24	28	28	20	100
15	WB2ABD	0	4	4	8	16
16	WD4OIN	4	0	0	0	4
TOTALS:		264	212	200	148	824

- Numbers Reflect Contacts On County Line (2 Counties) With Both of Our Calls

Many have asked about who is currently involved in digital county hunting. Table 1 below contains my first try at creating a list of active digital county hunters. There are 46 call signs on this list (arranged alphabetically). I know of 7 people who have "put out" a significant number of counties operating mobile (some of these may not be currently active). Calls on the list range from very active to those who have made only a few digital contacts from their fixed stations.   Also, there are a few folks (like AB7NK and KD5CXO and others) who have expressed an interest in operating digital, but are still in the process of setting up their stations.   If I have left any one off the list you have my sincere apology!

 I really need everyone's help in completing this table and correcting errors (of which there are many right now). Please email me at w0nac@comcast.net with your corrections/additions. I plan on publishing updates to this list each month.

Table 1 - Active Digital County Hunters Award Status

#	CALL	NAME	STATUS* (M,F)	USA - DIGITAL Counties (of 3077)	(1 MODE)	(2 MODES)	FIVE MODE COUNTIES (3 MODES)	(4 MODES)	(5 MODES)
1	AA8R	Randy	F	1000+	?	?	?	?	?
2	AC0B	Cliff	F	?	?	?	?	?	?
3	AD1C	Jim	F	?	?	?	?	?	?
4	K0DEQ	Bill	F	?	?	?	?	?	?
5	K0WJ	Lou	F	?	?	?	?	?	?
6	K4PBX	Jim	F	?	?	?	?	?	?
7	K5GE	Gene	F	?	?	?	?	?	?
8	K5SF	Dick	F	?	?	?	?	?	?
9	K7REL	Tom	F	?	?	?	?	?	?
10	K8QWY	Ed	F	?	?	?	?	?	?
11	K8ZZ	Ed	F	?	?	?	?	?	?
12	KC3X	Hollis	F	?	?	?	?	?	?
13	KC6AWX	Bob	F	?	?	?	?	?	?
14	KD5YUK	Billy	F	?	?	?	?	?	?
15	KD7KST	Bill	M/F	1792	?	?	?	?	?
16	KG5RJ	Gregory	F	?	?	?	?	?	?
17	KM1C	Bill	F	?	?	?	?	?	?
18	N0KV	Barry	M/F	?	?	?	?	?	?
19	N0LXJ	Sharon	M/F	1296	3077	2188	1095	344	137
20	N1API	Al	F	?	?	?	?	?	?
21	N3HOO	Ed	F	?	?	?	?	?	?
22	N4JT	Jim	F	?	?	?	?	?	?
23	N5MLP	Ron	M/F	?	?	?	?	?	?
24	N6PDB	Dennis	F	?	?	?	?	?	?
25	N8CIJ	Dick	F	?	?	?	?	?	?
26	NA8W	Darl	F	?	?	?	?	?	?
27	NF0N	Mike	F	?	?	?	?	?	?
28	NN9K	Pete	F	?	?	?	?	?	?
29	NT2A	Gene	F	?	?	?	?	?	?
30	NU4C	Paul	F	?	?	?	?	?	?
31	NW6S	Jim	F	?	?	?	?	?	?
32	NX4W	Lloyd	M/F	?	?	?	?	?	?
33	W0NAC	Matt	M/F	1683	3077	2752	1799	805	200
34	W0QE	Larry	F	?	?	?	?	?	?
35	W4IHI	Gary	F	?	?	?	?	?	?
36	W4YDY	Dave	F	?	?	?	?	?	?
37	W6RK	Risto	F	?	?	?	?	?	?
38	W6RLL	Joe	F	?	?	?	?	?	?
39	W7QQ	Bill	M/F	?	?	?	?	?	?
40	WA4EEZ	Leslie	F	?	?	?	?	?	?
41	WA4UNS	Doug	F	?	?	?	?	?	?
42	WA7JHQ	Sterling	F	?	?	?	?	?	?

43	WB2ABD	Paul	F	?	?	?	?	?	?
44	WD4OIN	Jack	F	?	?	?	?	?	?
45	WQ7A	Terry	F	?	?	?	?	?	?
46	WY4D	Bennie	F	?	?	?	?	?	?

HOW DO I GET STARTED ?

Getting started with digital operation may be easier than you think. Besides a transceiver and antenna (which you presumably already have!) all you need is a computer, an interface connection, and some software for the mode(s) you wish to run.

The computer can be just about any kind and doesn't need to be new or especially fast. Older XP machines up to the newest Windows 7 64-Bit machines will all work. Since you may be doing some multi-tasking, I do recommend that you have at least 1 GB RAM on XP computers and 4 GB on Windows 7 computers. You will need a modest amount of free space on your hard drive also.

There are many commercial interfaces available out there or if you are so inclined, you can "roll your own". The trend in commercial gear seems to be toward devices that plug into a USB port on your computer. Newer computers don't even have the older serial ports anymore! Also, some of the newer interfaces contain their own dedicated sound card which leaves the sound card in your computer free to serve other functions. These newer USB devices don't require a separate power supply either (they get their power from the USB port), are easier to set up, and typically only use 2 cables. The interface I recommend is one I currently use. This is the "SignaLink USB" device by Tigertronics (http://www.tigertronics.com/slusbmain.htm). This great little box costs something over $100, but is worth every penny!

If you wish to go a different direction, MFJ (http://www.mfjenterprises.com/productsearch.php) and West Mountain Radio (http://www.westmountainradio.com/content.php?page=rigblaster) also offer USB interfaces.

To just listen and decode digital signals, the only interface you need is to place your computer microphone in front of your radio speaker! One can't get much simpler than that.

There is so much software available these days that it can be confusing to the newcomer. Most of it is freeware or shareware, but some is licensed (for a fee).   Also, when you buy a commercial interface, most manufacturers provide a CD with a large number of digital software programs that you can experiment with. Probably the best commercial software I have run across is **MixW** written by UT2UZ in the Ukraine. You can find out all about it at their web site which is: http://mixw.net . I believe their latest version is 3.1.1. **MixW** is extremely competent software, but can be very intimidating for the beginner because it is complex and has many features not needed initially.

Fldigi is an excellent free software program that I personally like a lot. You can download the latest version (3.21.50) setup files for your computer at the following site: http://w1hkj.com/download.html . If you wish to learn more about it first, a Beginners Guide is available at: http://www.w1hkj.com/beginners.html .

Other freeware includes the old standby DigiPan (available at: http://www.digipan.net/ and Ham Radio Deluxe – Version 5.0 which you can download from: http://www.hrdsoftwarellc.com/downloads/default.html .

If you wish to explore other software that is available, go to the following site http://www.qsl.net/rv3apm/ which lists a multitude of software programs, modes they are good for, price/free, and latest version. Links to download sites are also provided.

I recommend that you start with Fldigi, but plan on spending a fair amount of time reading the manual and getting it working properly.

After you have your interface and software on hand, install your software and do an initial configuration. Then, connect your interface to your radio and your computer as the manufacturer recommends and configure it so you can receive and decode signals on your waterfall. Next, you will want to get your PTT (Push To Talk) configured so that your software automatically puts your radio into the transmit mode when you command the software to transmit. Lastly, you will want to select and adjust your audio devices and levels to get a distortion free signal going out to your antenna.

All this can be confusing at first, but if you read your instructions carefully and just dive in and experiment, you will eventually wonder what you thought was so difficult! Also, I can help you if you get stuck. Just email me at w0nac@comcast.net or call me at 303-799-3658.

WHICH MODES ARE USED ?

By far and away, the single most popular digital mode (excluding **CW**) used by the amateur community at large is **PSK-31** with **PSK-63** growing in popularity because it is twice as fast. **RTTY** has been popular for years and many DXpeditions use **RTTY**, but more seem to be shifting toward **PSK** because it is a better weak signal mode than **RTTY**. When county Hunters first started using digital modes, **PSK** was the mode used most often. Over the last year or so, other digital modes have come into play including **RTTY**, **MFSK**, **THROB**, and occasionally **CONTESTIA**. Choosing modes for putting out counties is still very much in the experimental phase, but I am sure that a more consistent approach will evolve over time as more people get involved. When Sharon and I have been putting out county lines the last few months, we have pretty much settled on **PSK-63**, **RTTY**, **MFSK-16**, and **THROB-4** in that order.

All these new modes appear strange and different to new folk. G4UCJ has an excellent site you can visit that explains what most of the modes authorized for county hunting are and even what they sound like. You can find his site at http://hfradio.org.uk/html/digital_modes.html .

What frequencies to use for digital county hunting is also a frequently asked question. Mobiles putting out counties seem to have settled on 14.074 MHz or 14.075 MHz true frequency as a good choice. Non-County Hunter PSKers seem to operate between 14.070 and 14.0725 MHz. JT-65 People generally operate on 14.077 plus or minus 1 KHz or so. This leaves a small window around 14.074-14.076 that is generally open for County Hunter use. 20M seems to be the best overall band to use with 30M and 40M being 2nd and 3rd choices using 10.136 MHz and 7.071 MHz true frequency respectively. All of these frequencies are subject to slight

adjustment up or down depending on QRM. All frequencies mentioned above are "true" frequencies which are your transceiver dial setting (USB) plus the offset on your waterfall. I will explain this in more detail in a future article.

HOW CAN I GET STARTED RIGHT NOW ?

As in all county hunting operations, award success ultimately depends heavily on those who go out mobile and put out the counties. Digital county hunting is no different! But, it has been said that one must learn to walk before you can run. Even though more mobiles operating digital are desperately needed, it is extremely difficult for anyone to jump directly into operating digital while mobile. To "eat this elephant one bite at a time", let me suggest an easy way to sample what digital operation is like with a minimal investment in time and zero cost.

First, download the free file "fldigi-3.21.50 setup" to your desktop (or other convenient folder). This file can be found on the Fldigi download page at http://w1hkj.com/download.html . If you wish, you can also download the files "Fldigi-Help" and "fldigi manual" for reference. Once downloaded, go ahead and install "fldigi-3.21.50 setup" by running it. Just select the default options during install. You will then be presented with the Fldigi configuration wizard where you will enter your operator information and set your audio devices. The Rig control section can be mostly ignored for now as you won't be transmitting. When configuring your Sound card, all you need do is check PortAudio and set Capture: to your normal microphone device (naturally, you will need to have a microphone plugged into the MIC jack on your computer). After saving your configuration, click on Close and you should be ready to go.

Place your computer microphone in front of or near to your transceiver speaker. Then adjust your computer microphone gain and your transceiver audio output until you get a waterfall with just a little noise showing. Set your transceiver dial to 14.070 (USB) and you should start to see signal traces moving down the waterfall. Then click on the "OpMode" option at the top of the Fldigi window and select the BPSK-31 Sub Mode to the right of PSK on the drop down menu. You can then tune to any trace you see by clicking on top of it. This should move your tuning indicator over the trace and the signal should start decoding in the upper window.

For decoding any mobile County Hunters you might find spotted out there, just set your OpMode to the sub-Mode they are using and adjust your dial setting plus waterfall offset to their spotted frequency.

If you find the digital modes interesting, you can then obtain an interface which will allow you to transmit from your fixed station. Then, after you become comfortable operating digital from your fixed station, you will be ready to go mobile where you will be welcomed with open arms!

TOPICS FOR FUTURE ARTICLES

Here are a few topics I am considering for future articles. Feel free to suggest others if you wish. I want these articles to be as useful to you as possible, especially new people.

"How to tune digital signals"

"How to adjust your rig for a clean signal"

"How to 'put out' counties mobile"

"How to operate as a mobile OM/YL team"

"How to fine tune your Interface"

"How to use macros with specific examples"

"Other Interesting modes (JT-65)"

So long for this time…..Please email me with your comments/suggestions at w0nac@comcast.net and don't forget to send me your counties worked status on the **USA – Digital** and **5 Mode Awards** so I can publish an updated list in future articles.

73's

Matt – W0NAC