

The APRS Local Voice Repeater Initiative

<http://www.ew.usna.edu/~bruninga/localinfo.html>

Bob Bruninga, WB4APR

OPERATING FREQUENCIES ON APRS:

For the traveler in a new area, a local-repeater-frequency packet flashed on the left side of the display shown in figure 1 below shows the best recommended local repeater for finding a QSO or for local information. This has always been a part of APRS, but seems not to be reliably implemented in many areas. In Jan-07 we launched the *Local Info Initiative* to get all areas to support not only this application, but other APRS objects to show local IRLP, EchoLink, and Winlink frequencies as well for the benefit of mobiles.



Figure 1. The local recommended voice repeater shows up on the left of the APRS screen. In this photo, I was using the right side of the radio to monitor for the ISS, when this local repeater object came in on the APRS channel.

APRS IS NOT JUST VEHICLE TRACKING: APRS was invented back in the 80's as a universal local tactical info exchange channel designed to inform all users of everything going on Ham radio in the surrounding local area in real time via short occasional packets. APRS was not designed as a Vehicle tracking system! Tracking was only a subset added in the 90's when GPS became plentiful. We assumed that local frequency information would appear on APRS mobile displays. . APRS is all about facilitating communication between users. . Knowing the local recommended frequency or IRLP node, or EchoLink node is very important to travelers.

RECOMMENDED REPEATER FREQUENCIES: In Jan 07, FINDU.COM showed less than 8% of about 391 repeaters, actually displayed the frequency of the repeater as the object name. And only 14% of 533 Mic-E repeater symbols. All the rest simply displayed the repeater callsign which does not stand out nor help the mobile operator very much compared to seeing the actual frequency on his radio. The symbol recommended for Voice repeaters has been the /r.. To see the progress we are making on this initiative, you can view a list of all the repeaters in a given frequency range by simply wildcarding a 100 kHz range of frequencies. You have to use these smaller groups, since this FINDU.CGI only lists 50 at a time. So for example, to see all of the 147.0XX repeaters, use this URL:

http://map.findu.com/147.0*

TINY WEB PAGES: When the Kenwood D7 and D700 APRS mobiles came out in 1998 that could provide this kind of text info directly to the radio front panel, we called this info **Tiny-Web-Pages** and presented it in a paper [1] for the year 2000 DCC. The original APRSdata.exe program provided to these users on the front panel of their radios, information on everything such as WX, Satellites, DX, traffic, Nets, Meetings and so forth. But as APRSdos became less used, and follow-on APRS clones mainly implemented just the simple vehicle tracking subset of APRS, most users these days have not seen these other applications.

In other words, as a mobile operator, I expect to see lots more than just tracker callsigns show up on my radio. Some examples:

NET or MEETING Objects on the D7/D700 or HAMHUD Display

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+-----+ +-----+ +-----+ +-----+
| NET-NOW | | MTG-NOW | | CLUB-MTG | | HAMFEST |
| 7PM TU 5th | | 7PM Tues | | 8 PM Thur | | Sat 23 Jun |
| 147.105+ | | 25 Jan | | 27 Jan 07 | | FARFEST |
+-----+ +-----+ +-----+ +-----+

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I also expect to see local meetings and nets on the front panel of my APRS radio LIVE while they are happening. These objects not only describe the event, but also the radio shows the distance and direction to the meeting. WB4APR

For NETS I would use the "/N" NTS symbol and for meetings and HAMfests, the big "/E" EYEBALL symbol is recommended.

THE LOCAL INFO INITIATIVE: This paper highlights this new initiative to get back some of this original APRS functionality. In particular, the display of local voice repeaters to mobile travelers in new areas such as shown above. The display at the top of this page is what flashes on the front panel for 10 seconds when the packet is received. If the driver does not happen to see this display, then the Repeater will show up as a FREQUENCY object on the radio's STATION list as shown in figure 2 below:



Figure 2. This photo shows how these Frequency objects show up in the station list for instant recognition.

In this case, the newer 146.76 repeater has appeared on the list and the older 146.94 repeater from the previous town is going down the list. Of course, usually it is *much* further down the list than shown here. When the user sees one of these repeater objects in his STATION list he can know that he is in DIRECT range of that repeater and he can select it to see any other amplifying information. In this case,

shown below, the repeater has a -600 offset and has regularly scheduled Nets at 9 PM on Tuesday Nights.

ADDENDUM: *Since these photos were taken, there were some refinements to the formats such as adding + or - in the object name to avoid wasting the +600 or -600 in the text fields. Also, the TONE was simplified to **Tnnn** and the nominal operating Range was added, **Rxxm***



Figure 3. Once selected, the full details on this 146.88 repeater are shown. Again, the -600 and PL103 is no longer the final recommended format, being replaced with simply (-) in the frequency name and Tnnn for the Tone.

The new photo, Figure 4, below shows an example of the correct final format, though it does not use the 3rd line of 8 characters to also include the club meeting dates. Note also that TONE is now **Tnnn** and typical useable range of this repeater is **R30m** in this case. It has a weekly net on Thursdays at 730.



Figure 4. This photo from Tim N8DEU shows the final format that has been developed for this application. This is how the object looks when it first comes in on the APRS side of the radio. In this case, his voice side of the radio (band-B) is already tuned to 146.94 –

PHILOSOPHY: It is very important for all users of APRS to understand the details and purpose of this local info system. And the most important aspect of this system is the word *LOCAL*, that is, the packet announcing such a voice repeater is seen *DIRECT ONLY* in no other area then the local *DIRECT* coverage area of the repeater itself. It violates the principle of this concept if these repeater objects are seen in areas where the repeater cannot be immediately be worked *DIRECT*.

- **Done right**, repeater objects are a great asset to the APRS Traveler with no impact on the network.
- **Done wrong**, repeater objects are just more QRM and SPAM.

FREQ SPEC: This is all just part of the APRS Frequency Specification that encourages the addition of FREQUENCY information in all position packets of significance to improving user-to-user communications. See the Frequency Spec on <http://www.ew.usna.edu/~bruninga/aprs/freqspec.txt>.

WHICH REPEATERS: The first concept is that very few of the ten thousand or so voice repeaters should even be considered to be announced on APRS. If more than one repeater in an area is announced, then the value of the system is diminished. We end up with nothing more than a repeater directory on the air which is displaying too-many repeaters in any given area to have any idea which one is the best for the APRS Traveler. In any given area there is usually one generally recommended repeater for the long haul and through traveler. That is usually the repeater with the highest probability of finding someone at all hours. ONLY those such repeaters (and/or known APRS dominated voice repeaters) should be indicated on APRS.

KEEP IT LOCAL! The second concept is that the packet should only cover the same area as the useable area of the voice repeater. And the packet should be originated at an APRS digipeater so that the packet does not collide with any other packet on the air. The digipeater can hear everything on the APRS channel, and it will only originate this info packet when the channel is otherwise clear. This is why this local info can be added at no cost to the network. See the list of APRS ARRL area coordinators on <http://www.ew.usna.edu/~bruninga/aprs/aprs-arrl-coords.txt>.

FORMATS: The New-N Paradigm includes the details on how to set up these repeater info packets as objects in the BeaconText of a New-N Paradigm DIGIPEATER. The exact format was derived after extensive discussion and testing on the APRSSIG so that they would show up well on the displays of the D700 and D7 and HAMhud for best appearance on the front panel. Using those recommendations, the packets will only be seen locally and there will be no digipeats and no collisions with local traffic. Only THREE settings in each digipeater are needed:

BEACON EVERY 10 (every 10 minutes)

UNPROTO APN383 (For a KPC-3+ version 8.3. Note, no hops!)

BTEXT

;FFF.FFF+x*111111zDDMM.hhN/DDMM.hhWrAAAAAAAAAABBBBBBBBBBCCCCCCC . . .

Where ;FFF.FFF+x is the frequency, (+/-) is the offset and "x" is an

- optional local unique character
- or ;FFF.FF+xy where "xy" is one of over 3600 unique characters A-z, 0-9
- or ;FFF.FF+SS where "SS" is your state (if you are first to use it)

Where *111111z is the default null Date-Time field for the OBJECT format

Where DDMM.hhN/DDMM.hhWr is the LAT/LONG and "r" symbol for a voice

repeater

Where AAAAAAAAAA, BBBBBBBBBB, CCCCCCCC, ... are 10x10x8 free-text fields.

For UIDIGI roms see

http://www.qsl.net/n8deu/uidigi_eprom_settings.htm

The free-text field can actually be 37 bytes long, but only the first 20 bytes are visible on the D7 and Hamhud (without scrolling) and only the first 28 bytes are visible on the D700. Further, when these packets first come in, they are flashed on the radio in the indicated 10x10x8 three line format. So it is best to meet these word boundaries for best display on the mobiles. The following are my recommendations for the free-text fields in descending priority order. ("_" denotes a SPACE character):

First line (10 bytes AAAAAAAAAA):

_T123 R45m -(Combines PL tone and Range (miles or Kilo) on the first line.

_D234 R45m -(Combines DCS code and Range on the first line.

_N45m S15m -(different ranges N/S or E/W (here, 45m north and 15m south)

Second Line (10 bytes BBBBBBBBBB):

_Net Tu9PM (if it has regular nets worthy of note to visitors

_Net M 9PM (For one letter days)

_Net Tu730 (another example assuming all nets are PM)

_144.875in (optional if it has a non standard split)

Third Line: (8 bytes CCCCCCCC):

_Mg3rd W (for meetings on M, W or F

_Mg3rdTH (for meetings on Tu, Th and Sa or Su

Additional text: . Following the above 28 bytes, additional text may be included for APRS clients and home stations, but it will not show up on the D7 or D700.

RANGE INDICATION: Range is useful for the mobile, since the D7 or D700 calculate and display the range to the object. . If the Radio says the repeater is 35 miles away, and the text says it is good to 45 miles, then it is quite useable. This can also be "**R30k**"for kilometers. If the range is quite skewed, this too can be specified by including the maximum range and direction and minimum range and direction. In this case, one of the directions will have to replace the tone indication. We don't need to specify the TONE tenths since they are all standardized anyway. If it is DCS then the line would be "**D456 R45m**"

POSITION AMBIGUITY: Remember that these objects can use position ambiguity since the exact location of the repeater is not needed, only its approximate location. . One-mile ambiguity is obtained if

you replace the "hh" digits of LAT/LONG with two spaces each. If you want greater 10 mile ambiguity then also replace the unit's digit of minutes with a space too.

IRLP and EchoLink FREQUENCY OBJECTS: In addition to the locally recommended VOICE QSO repeaters, the IRLP and EchoLink repeaters are also highly recommended to have LOCAL objects on APRS also. Their format is somewhat similar, but we want them to show up in the station list as **IRLP-NNNN** and **EL-NNNNNN** to clearly differentiate them from the voice repeater frequency objects. Please see the AVRS web page for the overall concept and the APRS Freq Spec page for the details.

AVRS: <http://www.ew.usna.edu/~bruninga/avrs.html>

SPEC: <http://www.ew.usna.edu/~bruninga/aprs/freqspec.txt>

ANY STATION WITH FREQUENCY! and finally... any station that includes his frequency in his position packet will also show up to make it easy to establish communications. In the photo shown in figure 5 below, the new D710 not only includes a new right hand column for displaying the FREQUENCY of each station, but also the radio has a TUNE button that will instantly tune the radio to the station's indicated frequency! Also notice the SORT button. Not only can you sort all stations by RANGE, to find out who is closest to you, but if you are looking for the local repeater frequency objects, you can sort by CALLSIGN and then all of the numeric FREQUENCY objects will show up in the top five stations on the list! The rest are alphabetic making it easy to find other stations by callsign.



Figure 5. The new TM-D710 radio has a separate column for frequency in the station list. It also has a TUNE button to instantly QSY the radio to the indicated frequency.

OBJECTS FROM APRS CLIENTS NOT DESIRED: In most cases, such repeater frequency objects originated as normal APRS objects from home user clients *are not generally welcome*. These client originated repeater objects are generally *not welcome* for several reasons:

- These objects are not on a reliable 10 minute rate for local info or are too infrequent to be of any value
- These objects are often transmitted multiple hops instead of DIRECT ONLY and add QRM everywhere
- These objects on the uplink have a high probability of collision with other users
- These objects also take twice the channel time for a digipeat
- There is no limit to the ego or number of such objects a local client can generate

ONE-DIGI / ONE-VOICE-REPEATER: The simple rule of thumb, is that in the coverage area of each APRS digipeater, most locals can agree on which is the single most important voice repeater for that local direct area. Therefore, that digi should include that one voice repeater in it's beacon text. Done. This is all part of the New-N paradigm, but apparently many sysops didn't notice this part of the New-N paradigm settings.

The reason for this new initiative are some recent long distance travels such as an 1800 mile round trip between Maryland and Alabama, where I only saw a few such voice repeaters the whole way. In fact, I spent almost all of my radio time while mobile, tuning around and trying to find the travelers repeaters. About the only way I ever found these repeaters was by running into another APRS user running Voice Alert. His PINGS alerted me to his simplex presence, and I could call him and then I could ASK him what was the local channel for the traveler. See the Voice Alert Web page: <http://www.ew.usna.edu/~bruninga/VoiceAlert.htm>

OBJECT PERMANENCE: Although these Frequency objects are unique local objects, there has always been the potential for confusion in the APRS system when local objects with common names are collected globally by the APRS-IS system. Fortunately for this application, there are no local display issues because no two repeaters would ever cover the same *direct* area on the same frequency. Thus on the front panel of a mobile radio or HAMHUD, only the local frequency would ever appear. For the global APRS-IS, however, there are three solutions as documented in the APRS1.2 proposed addendum: <http://www.ew.usna.edu/~bruninga/aprs/aprs12.html>

- 1) Object permanence is indicated with the unique Date-timestamp of **11111z** in the object format
- 2) A repeater object can have one of 62 unique FFF.FFF-X names by choosing an unused character for "x".
- 3) A repeater object can have one of 3600 unique FFF.FF-XY names by choosing an available "xy".

NEW INITIATIVE IMPLEMENTATION STATUS: At any time, you can query FINDU for the "r" symbol objects by using this URL: <http://www.findu.com/cgi-bin/symbol.cgi?icon=/r&limit=2000>

As of 26 April 07, there are over 440 such objects. Unfortunately, however, a lot of them are legacy and do not conform to the new standard formats for display on radio front panels. . My count today in July 2007 shows about 85 in the New FREQUENCY format.

NOTE: For now, FINDU has a problem with the "+" symbol in all FFF.FFF+ objects and those objects will not show up on the FINDU maps, but they DO show up well in the "/r" list of repeater objects. This quirk is of no consequence to the on-air RF users and the only thing we need FINDU for is to resolve any dupes. These objects still show up just fine in the "/r" symbol list.

CONCLUSION: On long trips, no matter where you are, you should be able to see not only one of these recommended voice repeaters on your screen, but also the nearest IRLP or EchoLink node as well... This information combined with APRS Voice Alert will guarantee that if there is someone nearby wanting to chat, you should be able to find each other.

Bob Bruninga, WB4APR