

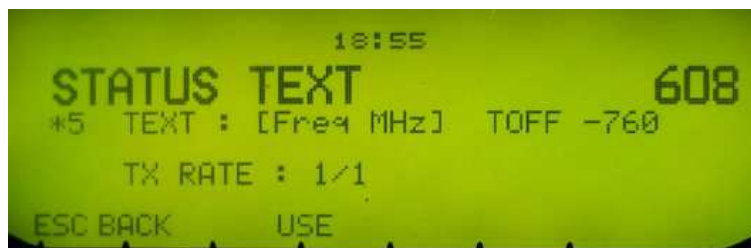


# APRS Frequenz Spezifikationen

für Baken und Objekte zur Nutzung QSY-Funktion  
mit direktem Tunen einschließlich Ablagen und CTSS

Für Kenwood TM-D710E & TH-D72E Besitzer

- Spezialfall: Mit der Wahl der Position 5 im Menu des Status-Textes (Menu #608) wird die aktuell auf dem Voice-Kanal eingestellte Frequenz übernommen und als Bake ausgestrahlt. (TX Rate auf 1/1 stellen!)
- Die Funkpartner können nun anhand des Bakentextes sehen, auf welcher Voice-QRG mein TM-D710E auf Empfang ist und mich dort rufen.
- Hat der Funkpartner ebenfalls ein TMD710E, wird meine Frequenz dort in der Liste angezeigt und kann mit **Tune** übernommen werden.
- Leider funktioniert dies nicht automatisch mit Tone und Ablage, lediglich die Frequenz wird vom VFO übernommen.
- Tone und Ablage (und/oder andere Informationen) habe ich deshalb von Hand angefügt.



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Quelle: Vortrag SWISSWISS-ARTG Fachtagung HB9BXQ 07NOV09

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<http://aprs.org/info/freqspec.txt>

APRS Freq Spec - AFRS (Automatic Frequency Reporting System) 09 May 12

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WB4APR

Revisions:

09 May 12 Clarified that Offset can always follow the Tone Tnnn format and is clarified as oXXX meaning +XXX or -XXX in 10's of KHz wherever Rxxm has frequently been shown in the examples when the offset is not transmitted (standard offsets used). IE, that location following Tnnn can be either Rxxm or oXXX.

The FTM-350 apparently does not decode `FREQ OBJECTS`. The suggested workaround is to continue to transmit standard `FREQ` Objects as before, and then add the `FFF.FFFMHz` for the locally recommended voice repeater as the leading part of the local `DIGI` text.

08 May 12 Clarified a significant misunderstanding. When the `FREQ` is transmitted as the `OBJECT NAME`, then there is no expectation of the first 10 byte `FFF.FFFMHz` field (except for crossband repeaters, and so the remaining fields do not begin in the 11th position, but begin at the start of the comment field. Scan for clarifications with a search of "08 May".

\*\*\* NOTE, a dual band APRS radio cannot TUNE or QSY to a cross band repeater anyway, without losing the APRS band! The information is in there for `DISPLAY` and `INFO` only.

07 May 12 Clarifies some wording. IE, `MHz` should be case sensitive for transmit, and insensitive for receive. Also added comments on observed inconsistencies in the use of a leading space. Better enumerated the 4 format categories for `FREQ` info. Removed the confusing 2nd-10-byte `FFF.FFF` + example due to confusion with the first 10 byte field where +/- are not allowed.

18 Jun 10 clarify 1750 Wideband and 1750 narrow (l/c "L")  
22 Oct 09 add WiRES objects  
22 Jul 09 add additional options for Echolink objects  
15 Jun 08 eliminate leading space in `FREQ` object  
21 Feb 08 add `WIDE/NARROW` and `TONE/CTCSS`  
13 Dec 07 update IRLP beacon info  
30 Sep 07 include Mic-E Echolink format for D710 radio  
16 Aug 07 finalize format of leading `SPACE` character  
1 Aug 07 merge in IRLP & EchoLink nodes (was on AVRS pages)  
21 May 07 include unique ID's for repeater frequency objects  
8 Oct 05 Original concept

Ham radio's biggest advantage of thousands of frequencies is also its biggest stumbling block at rapidly and efficiently establishing communications under emergent or immediate need or just to chat on a long trip across country. APRS provides a way to determine the operating frequency of the other stations and applications around us or to send to a distant station, a desired contact frequency. This initiative came out of the Hurricane Katrina lessons learned.

APRS, is a single resource for identifying and locating amateur radio operators on both a local and global scale. Over 30,000 stations

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world wide are currently in the system and you can view them in any area or near any station via any APRS client program or via any number of APRS web pages such as the following:

<http://aprs.fi> OR  
[http://map.findu.com/callsign\\*](http://map.findu.com/callsign*) ... and then select "stations near".  
<http://www.APRSworld.net>  
<http://www.jfindu.net>

FREQUENCY CATEGORIES: There are basically four categories of Frequency specifications in APRS:

FREQ OBJECTS - originated by local digis. FREQ is the object name  
Fixed FREQ COMMENT - included in any fixed position or object comment  
FREQ STATUS - Frequency included in STATUS packets for NMEA trackers  
Auto FREQ INSERTION - automatically included in position comment

The purpose of the APRS initiative is to standardize so that we know the correct frequency, Tone, offset, and maybe bandwidth. In addition, there are many other useful parameters that can be included in these beacons as well. These are the types of local objects that should show up on the mobile APRS display in every local area:

Every mobile's (or fixed station's) operating frequency  
The locally recommended voice frequency for visitors  
The local IRLP or EchoLink node and current node status  
The local WinLink node and current node status  
The frequency of any Net in progress  
Any other local ham radio asset or net of interest to APRS mobiles

KEEP IT LOCAL! These local fixed FREQ OBJECTS should ONLY be transmitted in the local RF area where they can be immediately used. Transmitting them any farther than DIRECT will not only add QRM and congestion to the local channel they are also just SPAM beyond the local simplex range in areas that cannot use them. The sources of these frequencies are as follows:

- \* Newer Mobile radios put their operating frequency in their STATUS text (not to be confused with the APRS "STATUS" packet which is a separate packet and is not part of this FREQ spec.
- \* Local Voice Repeater objects are TX'ed by the local DIGI's TEXTS
- \* IRLP, EchLink and WinLink objects are generated by their own software and injected into the APRS-IS. From there, each LOCAL IGATE SYSOP decides which IRLP and which Echlink and which WinLINK object is in his immediate area, and he then adds these specific individual objects to his pass-to-RF list via no more than a ONE-HOP-PATH...

RECOMMENDED TRAVELERS VOICE REPEATERS:

Every digi has a coverage area. It is the responsibility of that digi to transmit an object showing the best recommended travelers voice repeater in that coverage area, DIRECT, once-every-10-minutes. Being direct (no digipeats), they are only received in the vicinity where they are usable. Also, by originating at the Digipeater's high site, there is no impact on the channel load, because the digi will not transmit until the channel is clear. See:

<http://www.aprs.org/localinfo.html>

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WOTA, DX CLUSTERS, KATRINA: This APRS Frequency initiative is working in parallel with the post-Katrina ARRL Initiative to provide operating frequency contact information in support of emergency response.

Since the APRS-IS exists worldwide and already supplies information on all APRS stations, it can also accept data from WOTA, DX clusters and Logging programs to serve as a single resource for finding the likely operating frequency of interest for any station.

ADDING FREQUENCY TO APRS: Already, APRS encodes the following information into typical user position packets.

CALL, LAT, LONG, COURSE, SPEED (Grid is calculated)  
Station type (one of over 200 symbols)  
Antenna Height above average terrain  
Antenna Gain  
Comment (37 bytes max) (usually where stations have their frequency)  
Software version

FREQUENCY has been added in a backwards compatible manner, either as a fixed formatted field in the first 10 bytes of the existing free-field position comment text or as the noun name of an object packet.

In addition to the frequency information (9 bytes of an OBJECT name) or 10 fixed format bytes in a position comment, there are additional optional format bytes to include additional amplifying information about tone, range, net and meeting times. This information has been carefully formatted to show up well on the 10x10 byte displays of the D7, D700's, the HAMHUD, Yaesu's and other existing devices. A typical entry might be:

"FFF.FFFMHz Tnnn +500 RXXm". The Tone and Offset are fixed field formats followed by additional text such as Range (XX miles or km). If the offset is omitted, then the standard offset in the region will be used by radios on receipt. The tone does not include decimals.

FREQUENCY-in-MESSAGE: Similarly we want to be able to send a frequency in a message to another station, and for his station to either manually or automatically change his voice radio to that contact frequency. With this APRS capability, we can implement almost a ham radio version of cell phones. Just send a message to a distant ham callsign and let the system set up the voice links. See the <http://aprs.org/avrs.html>

FUTURE RADIO COMPATIBILITY: In response to this frequency initiative both Kenwood and Yaesu have released compatible radios. The Kenwood D72/710 and Yaesu FTM350 will automatically insert their frequency into their position text and on receipt, can parse it and automatically tune to that frequency with a single press of the TUNE/QSY button. See the Automatic Voice Relay System: <http://www.aprs.org/avrs.html>

LOCAL/GLOBAL VOICE CONTACT VIA CALLSIGN ALONE: One of the major initiatives for this frequency capability was to be able to set up end-to-end VOIP voice contact between amateur radio operators knowing only callsigns. By using APRS as the backbone signalling system, Automatic QSY can be implemented and this, combined with APRS messaging and IRLP or EchoLink networks can lead to fully automatic end-to-end voice connectivity between APRS users anywhere on the planet with only the knowledge of a callsign. All it takes is a little software. But that is where we are headed with this.

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**BACKWARDS COMPATIBILITY:** It is also possible that some PC controlled radios could be outfitted with simple external PIC processor that can interrogate the radios via their serial ports and can then insert their frequency information into their position beacon. This could easily be added to the firmware of some of the existing APRS TRACKER devices.

**NATIONAL VOICE ALERT FREQUENCY:** Presently, APRS operators already have a nationwide voice contact frequency called VOICE ALERT. This system for mobiles simply means that the APRS data radio is set to CTCSS 100 with the volume up. This mutes all packets, but allows the operator to be available for a voice call from anyone in simplex range running the PL 100 tone. Most APRS built-in radios can do this as is. Any APRS mobile packet system can also do this if the TNC is attached to the discriminator prior to the CTCSS squelch circuit. But Voice Alert only works within simplex range. That is why we also need to see the stations other Voice band so we can contact him via the repeater he is currently monitoring.

**OTHER VOICE SYSTEMS:** All specialized local voice assets should also beacon their operating frequency. The three other global internet amateur radio linked systems, IRLP, EchoLink and Winlink also include provisions for beaconing their POSITION and FREQUENCY data onto the national APRS channel using the FFF.FFFMHz format. This way, mobiles monitoring the national APRS frequency anywhere in the country can be aware of the position and frequency of all amateur radio assets around them.

### APRS FREQUENCY FORMATS:

-----

There are two Frequency formats. The POSITION/OBJ COMMENT format includes the frequency as FFF.FFFMHz in the free field text of a normal position or object report as noted above. The other is called the FREQ OBJECT format because it puts the Frequency in the OBJECT NAME using the format of FFF.FFxyz so that it shows up very clearly on the radio's positions/object list. Of course, an object can also have a frequency in its position comment as well. If both the object name and the comment contain a frequency, then the NAME is considered the transmit frequency for the object and the frequency in its comment text is its crossband or non-standard split receive frequency.

\*\*\* NOTE, [08 May] that a dual band APRS radio cannot TUNE or QSY to a cross band repeater anyway, without losing the APRS band!  
The information is in there for DISPLAY and INFO only.

As noted before, a 10x10x+ format is used for the POSITION COMMENT format for best display on the existing variety of APRS radios. Here are the standard 10-byte formats. Please note that spaces are required where shown. In some cases a "\_" may be shown for clarity in this document, but in the actual format, a SPACE should be used:

**CLARIFICATION 08 May 2012:** Note, if the FREQ is in the object name, (not in the first 10 bytes of the "comment") then the remaining comment text (such as TONE and OFFSET, etc) are left justified in the comment field. Examples for a FREQ OBJECT named FFF.FFxyz:

Example object comments

-----

Tnnn oXXX Rxxm ... Tone, Offset +xxx or -xxx, and or range

Tnnn Rxxm ... Tone and Range

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```
Tnnn ...           Tone only (radios will use standard offsets)
Tnnn -000 ...      Tone and forced simplex
tnnn oXXX ...      Tone and offset and Narrowband
1750 oXXX ...      Tone Burst with offset
1750 oXXX ...      Tone Burst & narrowband (Leading lower case L)
```

EXAMPLE POSITION/OBJECT comments when OBJECT NAME is not FFF.FFxyz:

```
1st 10-BYTES  Frequency Description
-----
FFF.FF MHz    Freq to nearest 10 KHz
FFF.FFFMHz    Freq to nearest 1 KHz
```

Examples:

```
146.52 MHz Enroute Alabama
147.105MHz AARC Radio Club
146.82 MHz T107 AARC Repeater (Tone of 107.2)
146.835MHz C107 R25m AARC      (CTCSS of 107.3 and range of 25 mi)
146.805MHz D256 R25k Repeater (DCS code and range of 25 km)
146.40 MHz T067 +100 Repeater (67.8 tone and +1.00 MHz offset)
442.440MHz T107 -500 Repeater (107.2 tone and 5 MHz offset)
145.50 MHz t077 Simplex       (Tone of 77.X Hz and NARROW band)
```

```
2nd 10-BYTES  Optional Added fields (with leading space)
-----
_Txxx RXXm    Optional PL tone and nominal range in miles
_Cxxx -060    Optional CTCSS tone and -600 KHz offset
_Dxxx RXXk    Optional DCS code and nominal range in kilometers
_1750 RXXk    Optional 1750 tone, range in km, wide modulation
_1750 RXXk    Optional 1750 tone narrow modulation (lower case L)
_Toff -000    Optional NO-PL, No DCS, no Tone, forced simplex
_Txxx +060    Optional Offset of +600 KHz (up to 9.90 MHz)
_Exxm Wxxm    East range and West range if different (N,S,E,W)
_txxx RXXm    Lower case first letter means NARROW modulation
_FFF.FFFrx    Alternate receiver Frequency if not standard offset
```

If a frequency is included in the first 10 bytes then "MHz" in mixed case is required to be transmitted. (Case should be case insensitive on receipt to allow for manual typos). Notice that the second 10 byte fields begin with a SPACE shown above as "\_" (9 useable bytes) for better reading of the packet when combined with a frequency in the first ten bytes. Do not include the "\_" but put a SPACE there in your actual packet. (8 May 2012 clarification: if the first 10 bytes do not contain a frequency, then left justify the TONE and OFFSET without the leading space). Here is the raw packet format for the comments:

```
FFF.FFFMHz comment...           one frequency
FFF.FF MHz FFF.FFFrx comment... for separate TX and RX
FFF.FF MHz T107 R25m comment... for TX, tone and range
FFF.FF MHz T107 oXXX R25m ...   for TX, tone and range
Tnnn oXXX R25m comments....     for a FREQ OBJ <08 May clarity>
Tnnn R25m comments....         for a FREQ OBJ standard offsets
Tnnn comments....              for a FREQ OBJ Tone only
```

The 10x10x8 byte format has been defined so that it shows up well on the TH-D7, TM-D700 and Hamhud displays. Examples are as follows:

```
+-----+ +-----+ +-----+
| >WB4APR-11 | | >WB4APR-11 | | >147.105md | <08 May clarity
| FFF.FF MHz | | FFF.FFFMHz | | T107 +060 |
```

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FFF.FFF M	T107 R17m	R25m text.
+-----+	+-----+	+-----+

OTHER COMBINATIONS: It is important to note that the TEXT field used for this frequency already has several possible options. Normally the comment-TEXT field begins after the SYMBOL byte. But there are already several defined 7 byte Data-Extensions that then push the comment-TEXT field further to the right as shown here. In many applications, an optional delimiter is added to make the packet more readable. This optional delimiter (usually a " " or "/") is not explicitly called out in the spec, but should be considered in all following parsing of the text field. All of these can be valid use of Data-Extensions and following FREQUENCY info.

```
!DDMM.mmN/DDMM.MMW$FFF.FFFMHz ...      begins after symbol ($)
!DDMM.mmN/DDMM.MMW$CSE/SPD/FFF.FFFMHz ...
!DDMM.mmN/DDMM.MMW$PHGphgd/FFF.FFFMHz ...
!DDMM.mmN/DDMM.MMW$DFSshgd/FFF.FFFMHz ...
!DDMM.mmN/DDMM.MMW$DFSshgd FFF.FFFMHz ... with SPACE insted of /
!DDMM.mmN/DDMM.MMW$CSE/SPDFFF.FFFMHz ... w/o delimiter
!DDMM.mmN/DDMM.MMW$PHGphgdFFF.FFFMHz ... w/o delimiter
```

LEADING SPACE ISSUE: Althout the optional delimiter shown here is a "/" it can also be a SPACE character too. The original intent of APRS was that any free text field that begins with either of these two delimiters, then they can be ignored and the beginning of the text field begins after them. We believe that Kenwood and maybe others did not allow for this option, and so a leading space will not work. We are trying to clarify this.... now in 2012...

FREQUENCY ON GPS TRACKERS: APRS was intended to be a two-way communications system between human operators. For this reason, transmit-only tracking devices should include their monitoring voice frequency in their packet beacon so that they can be contacted. The format is the same. Simply put the frequency in the position text. If the the tracker does not have that flexibility (such as a NMEA tracker, or Mic-E), then put the frequency into the STATUS BEACON text with the leading ">" STATUS formatter (not required in Mic-E):

```
BText >FFF.FFFMHz Tnnn oXXX etc.....
```

Where the leading ">" makes this packet an APRS STATUS packet and the "etc..." can be any additional free text (or Tnnn tone) as needed. On receipt, most APRS programs should combine this info with the station data to make the frequency parseable as needed.

RECOMMENDED VOICE REPEATER FREQUENCY OBJECTS:

Please see: <http://aprs.org/localinfo.html>

OBJECT NAMES: Every New-N Paradigm APRS digipeater is supposed to periodically transmit an OBJECT showing the locally recommended voice repeater frequency for travelers visiting the digi's own coverage area. APRS software should be able to locate these frequencies as well. The format for these frequency object names is as follows:

OBJECTNAME

```
-----
FFF.FFF-z   5KHz repeaters with up to 62 unique (z) ID's
FFF.FFFyz   5KHz repeaters with up to 2700 unique (yz) ID's
```



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FFF.FF-yz 10kHz repeaters with over 3600 unique (yz) ID's  
FFF.FFxyz 10kHz using three xyz unique characters...

Choose letters to make your repeater frequency unique in all the world so that it can be easily found by wildcarding the callsign FFF.FF\*.

The rest of the OBJECT format contains the TONE and RANGE and any specific information on regular net times and meeting dates. The format for these FREQ OBJECTS is:

```
;FFF.FFFxy*111111zDDMM.hhN/DDMM.hhWrT079 R25m NETxxxxxx MTGxxxx...  
;FFF.FFFxy*111111zDDMM.hhN/DDMM.hhWrT079 oXXX NETxxxxxx MTGxxxx...
```

(15 Jun 08 change. Eliminated the leading space before the T079)

Where T079 is a tone of 79.7 Hz (always drop the tenths)  
Where R25m is a Range of 25 miles (or k for km)  
Where oXXX is an offset in 10's of KHz +XXX or -XXX  
Where NETxxxxxx is something like "Net Tu9PM" or "Net Tu730"  
Where MTGxxxx is something like "Mg3rdTu" and must be 7 bytes  
Where ... 9 more bytes are possible but won't show on mobiles

These may at first appear very cryptic, but as a standard, they will become second nature. The goal is to put as much standard info into the minimum text that will fit nicely on the 10x10x8 displays of the D7, D700 and HAMHUD and on the 20 byte displays of the VX-8R and FTM-350.

TONES and DCS: We force the tone to 3 bytes always for simplicity of display, since all tones are standardized, they do not need the tenths. So T088, C067, T156 and DXXX are all valid entries. Lower case implies NARROW modulation as in t088, c067, t156 etc.

OBJECT NAME PERMANANCE: Notice that an object name needs to be unique since there are dozens of 146.94 repeaters in the country, and so these objects choose characters for the optional z, yz and xyz characters above to make them unique.

Since these can be upper and lower case and or numbers, this gives 62 unique identifiers for the 5 KHz repeaters and over 3600 for 10 KHz repeaters. If there are still conflicts, then other delimiters such as "\_=!^@", etc" can be used in place of the - separator. But always check to see if they get through on FINDU.COM using the link below. For example, FINDU.COM does not display FREQ OBJECTS that use the (+) character.

To see what frequencies are already in use, simply do a wildcard (\*) on the end of the FREQ in your favorite APRS-IS web engine. For example, [http://map.findu.com/146.94\\*](http://map.findu.com/146.94*) will provide a list of all 146.94 repeaters currently showing on APRS and their "xyz" modifiers currently in use!

These objects are transmitted with the pseudo permanent date/time stamp of 111111z. This unique time stamp declares this object to be permanent. This means that it should not be replaced by any other similarly named object unless that object is transmitted by the same originating station. This lets the originator of a permanent object update or move his object, but it then prevents his object from being replaced by anyone else's similar object.

DX CLUSTER FORMAT: APRS also decodes the DX CLUSTER format, and this format includes a frequency field too. All APRS software should

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decode and capture this frequency information also.

THE NEXT SECTION IS ALSO FOUND IN: [www.aprs.org/echo-irlp-win.txt](http://www.aprs.org/echo-irlp-win.txt))

EchoLink OBJECT FORMATS:

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EchoLink object names have the format of EL-123456 so that the node number can be easily seen on the station list of the mobile. This is important, since the mobile user has to have the node number to activate a link. Not the callsign of the node. The rest of the object uses the previous formats above to convey operating frequency and tone, and range. Here is an example OBJECT for EchoLink nodes.

```
;EL-123456*111111zDDMM.--NEDDDMM.--W0FFF.FFFMHz Tnnn STTS CALL...  
..... <= up to a max of 43 total characters
```

The "STTS" is only a four byte field for the current status of the node. Maybe "busy", "conf", "off\_", "idle" etc. The CALL is the callsign of this node. But we don't get the RANGE info. So maybe:

```
;EL-123456*111111zDDMM.--NEDDDMM.--W0FFF.FFFMHz Tnnn oXXX %CALL..  
..... <= up to a max of 43 total characters
```

Where % is a single byte to indicate Status. This will show with all of the information on the front panel of the APRS mobiles as:

```
+-----+  
| EL-123456 |  
| 438.700MHz |  
| Tnnn Rxxm |  
| %CALL.. |  
+-----+
```

The only loss is that the -R or -L does not show for most node callsigns unless they are four character calls. Though this is not needed by the mobile operator

POSITION DETAILS: In the LAT/LONG fields the TWO hundredths digits are shown entered as SPACE bytes so that the object is transmitted as a one-mile ambiguity object. Replace the two "--" bytes above with SPACES for it to work. The E between LAT/LONG makes APRS display the EchoLink symbol. It is hoped that a single central EchoLink server will generate these objects so that the only thing needed to get them on the air in a local area is to have the local IGate sysop to activate the local object by name for pass-to-RF.

ECHOLINK FORMAT USING MIC-E: This format is for the Kenwood D710 radio which reports its position in Mic-E format. This format will appear on the air as:

```
MYCALL>LLLLLL,DIGI:'GGCSD0E]FFF.FFFMHz Tnnn RXXm Ecolink node=
```

The LLLLLL is the latitude bytes, GGCSD are the longitude and course speed bytes. The "0E" are the ECHOLINK Symbol bytes. And the "]" byte indicates this is a D700 series Mic-E and the "=" on the end indicates it is the D710 version. The "FFF.FFFMHz Tnnn RXXm" is the frequency and range format. And "Ecolink node" is intentionally misspelled to fit nicely on the display of a D700.

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### IRLP OBJECT FORMATS:

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See the Scrip to add this to your IRLP node:  
[http://irlp.kc6hur.net/irlp\\_scripts.php](http://irlp.kc6hur.net/irlp_scripts.php)

IRLP object names are similar and have the format of IRLP-1234 or IRLP12345 if they ever go to 5 digits. This format is so that the node number can be easily seen on the station list of the mobile. The rest of the object uses the previous formats above to convey operating frequency and tone, and range. Here is an example OBJECT for IRLP:

```
;IRLP-1234*111111zDDMM.--NIDDDMM.--W0FFF.FFFMHz Tnnn oXXX STTS CALL...  
..... <== up to a max of 43 total characters
```

In the LAT/LONG fields the TWO hundredths digits are shown entered as SPACE bytes so that the object is transmittet as a one-mile ambiguity object. Replace the two "--" bytes above with SPACES for it to work. The I between LAT/LONG makes APRS display the IRLP symbol. It is hoped that a central server will be written for these objects as well so that they can be consistently generated into the APRS-IS and then only gated back to RF locally. The STATUS (STTS) can be something like these: (Idle, off\_, busy, etc). For more info, contact Mark Herson [n2mh@n2mh.net](mailto:n2mh@n2mh.net)

### WiRES OBJECT FORMATS:

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Yaesu WiRES nodes should also appear on the APRS channel. For example for an OBJECT NAME : WIR-1101D the format would be:

Example: WiRES Node Number = "1101D" (Lat:3348.43N/Lon:11802.32W)

```
;WIR-1101D*111111z3348.43NW11802.32W0430.900MHz D023 oXXX STTS...  
..... <== up to a max of 43 total characters
```

If an FTM-350 Radio is used as the WiRES node, then it will identify using the Mic-E format and should use this format:

```
MYCALL>LLLLLL,DIGI:'GGGCSD0W`FFF.FFFMHz Tnnn oXXX WiRES node _"
```

### WINLINK OBJECT FORMATS:

-----

WinLINK Telpac gateway object names have the format of W?-CALLSIGN (where W? can be WL or W1, W2,... W9 for multiple stations) so that the node callsign can be easily seen on the station list of the mobile. The rest of the object uses the previous formats above to convey operating frequency and range. The baud rate, "bbbb" for packet is inserted in place of the TONE, Txxx for voice. Here is an example OBJECT for injection into the APRS-IS:

```
;WL-AB9XYZ*111111zDDMM.--NWDDMM.--WaFFF.FFFMHz 1200 oXXX comment  
..... <== up to a max of 43 total characters
```

In the LAT/LONG fields the TWO hundredths digits are shown entered as SPACE bytes so that the object is transmittet as a one-mile ambiguity object. Replace the two "--" bytes above with SPACES for

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## für Baken und Objekte zur Nutzung QSY-Funktion mit direktem Tunen einschließlich Ablagen und CTSS

it to work. The W between LAT/LONG and "a" symbol makes APRS display the WinLink symbol.

MICROWAVES: Of course FFF.FFFMHz only works to 999.999 MHz, and so we have defined some letter designations above that. There are two methods. One, is to simply use GHz as in XXX.XXXGHz. But this is limited to wideband modes to the nearest MHz. Example is \_\_\_1.296GHz for 1296 MHz. But to retain one KHz resolution, we use this table of alphabetical extensions:

A96.000MHz would be 1296 MHz  
B20.000MHz would be 2320 MHz  
C01.000MHz would be 2401 MHz  
D01.000MHz would be 3401 MHz  
E51.000MHz would be 5651 MHz  
F60.000MHz would be 5760 MHz  
G30.000MHz would be 5830 MHz  
H01.000MHz would be 10,101 MHz  
I01.000MHz would be 10,201 MHz  
J68.000MHz would be 10,368 MHz  
K01.000MHz would be 10,401 MHz  
L01.000MHz would be 10,501 MHz  
M48.000MHz would be 24,048 MHz  
N01.000MHz would be 24,101 MHz  
O01.000MHz would be 24,201 MHz

APRS FREQUENCY-IN-MESSAGE FORMATS: A variety of formats have been proposed, but until someone is ready to implement either the auto-QSY on receipt of a message, or to transmit such a message, it is premature to nail down an exact format. But something like:

QSY FFF.FFFMHz! ... Auto QSY now  
QSY FFF.FFFMHz? ... Auto QSY unless user hits NO  
QSY FFF.FFFMHz. ... QSY if user manually hits TUNE

CONCLUSION: Examples of frequency use in APRS are obvious:

- 1) Advertising the voice frequency you are monitoring
- 2) Voice repeater and other local frequency Objects
- 3) Mobile GPS map display of surrounding frequency assets
- 4) IRLP and EchoLink nodes
- 5) WinLINK Packet nodes
- 6) EOC operations
- 7) Long distance travelers
- 8) ATV repeaters and links, etc...

Since the object of APRS is to facilitate local communications and situational awareness of all surrounding ham radio assets, everyone is encouraged to include their operating frequency in their position packets to make their availability known.

de WB4APR  
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