London Bridge Amateur Radio Association

STATIC

K7LHC
Lake Havasu City, AZ
Home of the London Bridge

March, 2009

A New Ham's Guide
How to Use Amateur (Ham Radio) Repeaters

(Tnx For Permission from N4UJW and Hamuniverse.com)

PART II

Why do Repeaters use an Offset?

Without having an offset between the transmit signal and the receive signal frequency, the repeater would simply hear itself when it was transmitting on the same frequency it was listening on!

Therefore, to use a repeater a user must use a different transmit frequency than receive frequency. Your actual transmit frequency is the exact same one that the repeater receiver is listening on. This is a form of duplex, or two frequency operation. It is known as half-duplex as you do not receive and transmit at the same time but normally use the push-to-talk button on your microphone to switch between the two. Cell phones use full duplex so each party can hear the other while the other is talking.

Even with the offset, the two frequencies are close enough that some isolation is required. Again, this isolation is done by the Duplexer. So you can see why some repeater components interact with each other and without the basic system components....nothing would work.

What's all those tones about?

What is a PL or CTCSS Tone?

PL, an acronym for Private Line, is Motorola's proprietary name for a communications industry signaling scheme called the Continuous Tone Coded Squelch System, or CTCSS. It is used to prevent a repeater from responding to unwanted signals or interference. Tone Squelch is an electronic means of allowing a repeater to respond only to stations that encode or send the proper tone. In other words, if a repeater is set up to operate only when a PL tone of say, 136.5hz is heard by it's receiver, then it will allow the transmitting station access. If your station, (your mobile, base or handheld) does not transmit the tone when you key up, then the receiver of the repeater does not hear you and will not be usable by your station until you set the tone in your radio. Any station may be set up to transmit this unique low frequency tone that allows the repeater to operate. If a repeater is "In PL mode" that means it requires a CTCSS tone(PL tone)to activate the repeater. Due to severe congestion of ham repeaters in some areas, most repeaters are PL'ed. These repeaters were once called closed repeaters.

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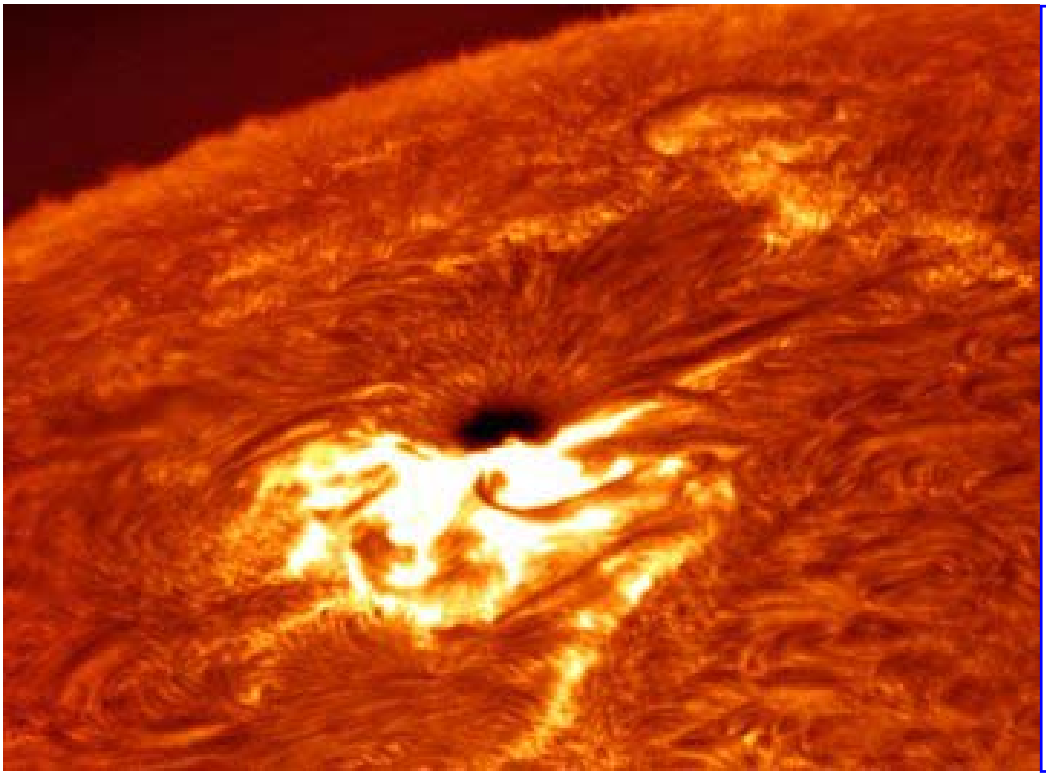
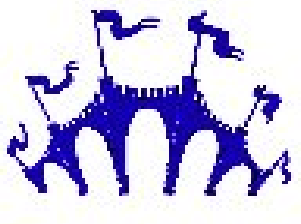
LBARA MEETING SCHEDULE		
MONTH	**BOARD**	**REGULAR**
MARCH	NOTE: BOARD	3/19
APRIL	MEETINGS WILL NOW	4/16
MAY	TAKE PLACE ONE	5/21
SEPTEMBER	HOUR PRIOR TO THE	9/17
OCTOBER	REGULAR MEETING	10/15



Have you Forgotten what these were? Well, here is a reminder of what a Sunspot looks like. Remember….Cycle 24 is really just around the corner! Good DX!

Monday Night Net (7 PM)

System	Location	Freq	Offset	PL
MCARS	Bullhead City	145.27	-	131.8
	Kingman	146.76	-	131.8
	Kingman	448.25	-	131.8
	Lake Havasu	146.62	-	131.8
	Willow Beach	147.12	-	131.8
CRRA	Lake Havasu City	146.96	-	162.2
	Lake Havasu City	224.24	-	156.7
	Lake Havasu City	146.64	-	156.7
	Lake Havasu City	449.95	-	141.3
BARN	Lake Havasu City	447.54	-	136.5
	Las Vegas, NV	449.95		136.5
	Onyx(Palm Springs)	449.34	-	136.5
	Orange County, CA	447.54	-	100



LBARA PROVIDES COMMUNICATIONS

FOR THE 2009 MARCH OF DIMES WALKATHON

LBARA has for many years provided communications for the March of Dimes Walkathons. This year was no different thanks to the following members: Reiner Schick (KD5MBA), Jim Varner (AE6N), Carl Schiller (W7CRL), Lyle Sibbald (K7YQ), Jim Gould (KF7X), and Lyle Ross (W6TPT).

Lyle Ross (W6TPT), Reiner Schick (KD5MBA), Jim Gould (KF7X), Lyle Sibbald (K7YQ)….all wearing their new tees. I guess Jim Varner (AE6N) and Carl Schiller (W7CRL) forgot to set their alarms and didn't make it to breakfast!

UPCOMING ACTIVITIES AND HAMFESTS

4/4 **Ham Desert-fest '09, Radio Society of Tucson, Kino Sports Complex, Tucson, AZ**

4/11 **Arizona ARC, DeVry Univrstity, Phoenix, AZ**

5/2 **Larry Warren Memorial Hamfest (Cochise ARA), 2756 Moson Rd, Sierra Vista, AZ**

5/30 **Annual Prescott Hamfest (Yavapai ARC/Verde Valley ARA), Granite Mountain Middle School, 1800 Williamson Valley Road, Prescott, AZ.**

8/15-16 **SW Division Convention (Santa Barbara ARC), Earl Warren Showgrounds, Santa Barbara, CA**

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TABLE OF COMMON PL TONES (in hz)

67.0	**94.8**	**131.8**	**171.3**	**203.5**
69.3	**97.4**	**136.5**	**173.8**	**206.5**
71.9	**100.0**	**141.3**	**177.3**	**210.7**
74.4	**103.5**	**146.2**	**179.9**	**218.1**
77.0	**107.2**	**151.4**	**183.5**	**225.7**
79.7	**110.9**	**156.7**	**186.2**	**229.1**
82.5	**114.8**	**159.8**	**189.9**	**233.6**
85.4	**118.8**	**162.2**	**192.8**	**241.8**
88.5	**123.0**	**165.5**	**196.6**	**250.3**
91.5	**127.3**	**167.9**	**199.5**	**254.1**

What Happens When You Key Your mic?

Let's "key up" a repeater and see what sequence of events are created within the repeater equipment when someone makes a transmission:

- You set your transceiver controls for the 146.84 "machine" and listen to see if it is in use...nothing heard.
  You key your mic and throw out your callsign...."This is KE5??? listening on the 146.84 machine". Then you release the mic button.
- Assuming your station is within range of the repeater....The repeater antenna picked up your signal with it's antenna on 146.24 (your transmit frequency set to the standard offset and the repeater's receive frequency) and sent it down the feedline to the duplexer.
- From there it was sent to the repeater receiver and converted to an audio signal (just like the sounds coming from your speaker)....sent to the controller (the brains of the repeater), then sent to the repeater transmitter and turned back into a much greater amplified radio signal on 146.84mhz (the output of the repeater)....sent to the duplexer....then thru the feedline to the antenna and out over the air.
- A mobile or base station that happened to be within range and monitoring the .84 machine heard your transmission on 146.84mhz (the repeater output frequency).
- Since radio waves travel at about the speed of light....at the split second that you first keyed your mic, the above events took place and the repeater was receiving your signal on one frequency and re-transmitting your signal on a different frequency at the same time!
- The mobile station that was listening on the output frequency of the repeater heard your call-sign....keyed his mic and came back to you starting the process all over again!
- A simple way of demonstrating what is going on with a repeater is to set a scanner or a second receiver tuned to the input frequency of a LOCAL active repeater...in the case above...146.24mhz and you can monitor it's input (and the stations using it if they are local).
- Then with your transceiver, monitor the output on 146.84mhz! You should be able to hear both the input signals and the output of the repeater as all this takes place on the air.

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How do you make a call on an Amateur Repeater?

First, LISTEN AND LISTEN SOME MORE..... to make sure that the repeater is not already in use. When you are satisfied that the repeater is not in use, set your transmitter power to the minimum and increase only as needed to make contact with the repeater, begin with the callsign of the station you are trying to contact followed by your callsign. e.g. " N4??? this is N3???". (The N3??? is your callsign). If you don't establish contact with the station you are looking for, wait a minute or two and repeat your call.

If you are just announcing your presence on the repeater it is helpful to others that may be listening if you identify the repeater you are using AND your callsign. e.g. " This is N3??? listening on the 84 machine or you could also say This is N3??? listening on 146.84 Dallas or the location of the repeater if known. This allows people that are listening on radios that scan several repeaters to identify which repeater you are using.

If the repeater you are using is a busy repeater you may consider moving to a simplex frequency (transmit and receive on the same frequency..... see more below), once you have made contact with the station you were calling. Repeaters are designed to enhance communications between stations that normally wouldn't be able to communicate because of terrain or power limitations.

If you can maintain your conversation without using the repeater, going "simplex" (both stations on same frequency in a different part of the band) will leave the repeater free for other stations to use that can't establish simplex communications!

Repeater Etiquette

The first and most important rule before using a repeater is to LISTEN FIRST. Nothing is more annoying than someone that "keys up" or DOUBLES in the middle of another conversation without first checking to make sure the repeater is free. If the repeater is in use, wait for a pause in the conversation (watch your S meter and wait for it to drop indicating the repeater is listening) and simply say "Emergency, Emergency, Emergency", and wait for one of the other stations to acknowledge your call. If for some reason you are not heard, then repeat the 3 "Emergencies" again...then if you are still not heard, try another nearby repeater.

This is not CB radio!

Don't use CB lingo on any ham band such as 10-4,.....don't say BREAKER!

Using the words BREAK, or BREAK, BREAK or BREAK, BREAK, BREAK or any combination of them on Ham radio can be misunderstood by an operator depending on his experience.

The word "break" or combinations of it carries many different meanings in the ham community and in the English language.

***Use plain language* on a repeater. If you want to know someone's location, say "Where are you.... or what's your location?" If you want to know whether someone you're talking with is using a mobile rig or a hand-held radio, just ask: "What kind of radio are you using?" You get the idea. Most repeater use is of a "local" nature so signals will be usually of very high quality. The use of the phonetic alphabet is very helpful at times.**

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Don't call CQ to initiate a conversation on a repeater. Just simply listen to make certain the repeater is not in use and then key your mic and say your call sign.
If someone happens to be listening and they want to talk to you they will respond.

When you are using the repeater leave a couple of seconds between exchanges to allow other stations to join in or make a quick call. Most repeaters have a "Courtesy Tone" (a short...beep or series of beeps) that will help in determining how long to pause. The courtesy tone serves two purposes. Repeaters have a time out function that will shut down the transmitter if the repeater is held on for a preset length of time (normally three or four minutes). This ensures that if someone's transmitter is stuck on for any reason, it won't hold the repeater's transmitter on indefinitely. (Don't laugh, many microphones get lodged in the fold of car seats and keep a repeater busy until it times out. Of course if it is not noticed soon by the mobile operator.....the control operator of the repeater may have to shut down the repeater until the problem is corrected.) When a ham is talking and releases the push-to-talk switch on their radio, the controller in the repeater detects the loss of carrier and resets the time-out timer. When the timer is reset, the repeater sends out the courtesy tone. If you wait until you hear this beep (normally a couple of seconds), before you respond, you can be sure that you are pausing a suitable length of time. After you hear the beep, the repeater's transmitter will stay on for a few more seconds before turning off. This is referred to as the "tail". The length of the tail will vary from repeater to repeater but the average is about 2 or 3 seconds.

You don't HAVE to wait for the "tail to drop" before keying up again, but make sure that you hear the courtesy tone before going ahead. Note: If you don't wait for the beep, the time-out timer may not reset. If you time-out the repeater, YOUR conversation AFTER the time-out will not be heard. The repeater time-out function does not care if you are still talking or not; and the station on the other end may rib you about hogging the machine and you will have wasted all those words! What is Doubling? When two stations try to talk at the same time on the same repeater, the signals mix in the repeater's receiver and results in a buzzing sound, squeal, distorted sound or severely jumbled and broken words.
When you are involved in a roundtable discussion with several other stations it is always best to pass off the repeater to a specific person (station) rather than leave it up it the air. e.g. "W3??? to take it, this is N3???", then unkey; or.....

"Do you have any comments Fred?, this is N3???"; un key.
You could also say "OK...that's all I have.....back to you Fred" or the next person in rotation... (un key).... Failing to use this or other techniques is an invitation to total confusion.
As a point of interest, a repeater will usually lock into the strongest of two FM signals. This is the nature of FM. The strongest signal usually wins.

(cont. in next month's Static)

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See Ed Gillespie, AB7EM at #453-7412

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GIANT AUCTION COMING IN NOVEMBER TO

OF 2009 TO BENEFIT THE LBARA. RIGS, ANTENNAS, MISC.

EQUIPMENT WILL BE SOLD TO THE HIGHEST BIDDER.

Dick's Questions To Ponder

Once you're in heaven, do you get stuck wearing the clothes you were buried in for eternity?

What disease did cured ham actually have?

Why do doctors leave the room while you change? They're going to see you naked anyway.

Why do toasters always have a setting that burns the toast to a horrible crisp, which no decent hu man being would eat?

Can a hearse carrying a corpse drive in the carpool lane ?

If electricity comes from electrons, does morality come from morons?

If Wiley E. Coyote had enough money to buy all that ACME crap, why didn't he just buy dinner?

Why is 'bra' singular and 'panties' plural?

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www.lbara.net

FROM THE EDITOR

If you have anything you would like to see included in these issues, please let me know. I'm always looking for articles, news items, construction articles, or anything that might be of interest to our readers. You can contact me at 928.855.7941 or email at grf@uneedspeed.net or francej@ajsinsurance.com.

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STATIC

ATTENTION READERS

Please note that this issue represents a "work-in-progress" and there are a number of changes to be made in subsequent issues. I would greatly appreciate your comments, both good and bad, as well as any suggestions for future issues. This issue also begins our first attempt to deliver the **STATIC** to your doorstep electronically. Please keep me abreast of any email address changes you may have and I promise to have this delivered promptly and accurately. Also, I still have a number of articles awaiting publication and will do so in the future. This is your newsletter, so keep the articles, letters, and pictures coming. I can be reached at home (855.7941), at work (855.3081) or via email at grf@uneedspeed.net .

EQUIPMENT FOR SALE

EDITOR'S NOTE : List your items for sale here. Ham radio related only, please. Include a picture if you like (please use a jpg format). Email all to me at grf@uneedspeed.net) along with your name and phone number.