

# STATIC



*February, 2009*

## **A New Ham's Guide**

### **How to Use Amateur (Ham Radio) Repeaters**

(Tnx For Permission from N4UJW and Hamuniverse.com)

Simple enough for even me to understand!

This article will help the New Ham to be more at home on repeaters and understand the operation and procedures on Ham Radio Repeaters.

It contains a basic description of a ham radio repeater, how to use it properly and is written with the NEW HAM in mind for the most popular ham band....2 meters.

#### **What is a Repeater and Why is it Needed, and How Does It Work?**

**What:** It's a two-way radio system that receives on one frequency, then re-transmits what it hears on another frequency; at exactly the same time. It's nothing more than a "dumb machine" with some smart people behind it.

**Why it's needed:** Your mobile or handheld transceiver, has a limited range due to it's antenna height with respect to the radio horizon and rf attenuating surroundings. Repeater systems are used to "transfer" your transmitted and received signals to much higher elevations electronically using large, very efficient antennas, low loss feedlines and a transmitter and receiver that is rated for heavy or continuous duty. A repeater "gets out" your signal and receives the station you are talking to with a far greater range and coverage area! You take advantage of the repeater's higher elevation to increase your effective transmitting and receiving coverage versus your mobile or hand held transceiver!

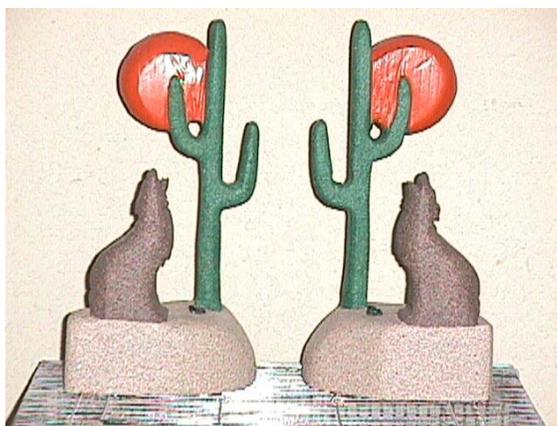
(continued on page 3)

## LBARA MEETING SCHEDULE

MONTH	BOARD	REGULAR
FEBRUARY	NOTE: BOARD	2/19
MARCH	MEETINGS WILL NOW	3/19
APRIL	TAKE PLACE ONE	4/16
MAY	HOUR PRIOR TO THE	5/21
SEPTEMBER	REGULAR MEETING	9/17

### WANTED: LOST TROPHY

Someone out there is the current custodian of the Club's Fox Hunting Trophy. The traveling trophy to hunts that had years and we once again. Hope will jog someone's trophy will be re-



Club gave out this the winners of fox been held in past would like to do so fully this picture memory and the turned the Club.

The London Bridge Amateur Radio Association

Fox Hunt Traveling Trophy

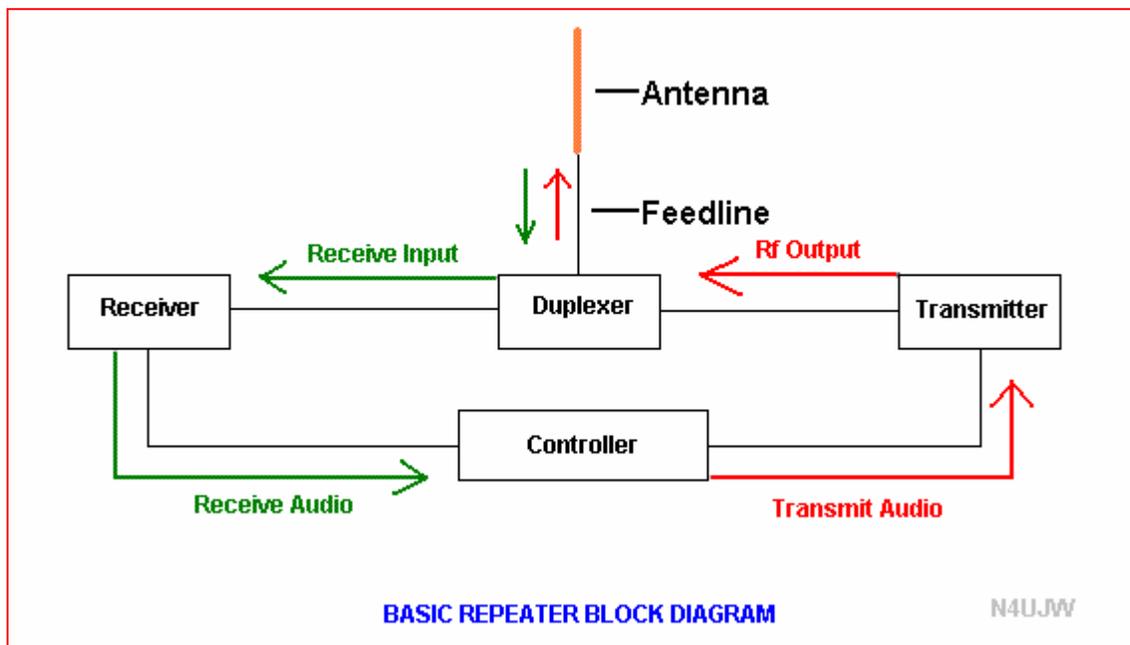
### Monday Night Net (7 PM)

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
CRRRA	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



## How does a Repeater work?

Here's a simple block diagram of a repeater below:



### The Basic Repeater Components:

#### Antenna

Most repeaters use only one antenna. The antenna is used on transmit and receive signals that are going into and out of the repeater. It usually is a high performance, heavy duty, and very efficient antenna located as high on a tower or structure as we can get it above the surrounding terrain.

Lots of repeater system antennas are located on a high hill or mountain.

Antenna systems for repeater use are usually very costly and have high gain.

#### Feed line

The feed line used on most repeaters is not just a piece of standard coax cable. A type of specialized feed line called Hard line is used. It is very similar to cable tv line that you see strung between power poles around town. The signal loss with hard line versus regular coax is much lower than in standard coax, so more power gets to the antenna and weaker signals can be received.

(continued page 5)

## UPCOMING ACTIVITIES AND HAMFESTS

2/20-21 Yuma AR Hamfest, Yuma County Fairgrounds, Yuma, AZ

3/14 Sping Hamfest, ARCA and Scottsdale ARC, Scottsdale Community College

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

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

### Duplexer

This device serves a major role in a repeater. The duplexer separates and isolates the incoming signal from the outgoing and vice versa. It prevents the receiver and transmitter from hearing one another by the isolation it provides. A duplexer has the shape of tall cans and is designed to pass a very narrow range of frequencies and to reject others. It helps to reject very strong nearby frequencies from other repeaters or rf producers from getting into the repeater system.

### Receiver

Receives the incoming signal. This receiver is generally a very sensitive and selective one which helps weaker stations to be heard better by the repeater. It is set to receive the input frequency. It's also where CTCSS (Continuous Tone Coded Squelch System) or "PL" decoding takes place.

### Transmitter

Most machines, as repeaters are sometimes called, have a transmitter composed of an exciter and a power amplifier. The exciter modulates the audio coming from the receiver which is tuned to the transmitting station's frequency at the proper transmit frequency, and the power amplifier simply boosts its level so the signal will travel further. Lots of repeaters use 100 watts or more. **It simply takes the weaker received frequency from say a mobile and re-transmits it (repeats) at a higher power level on a different frequency.**

### Controller

This is the brain of the repeater. It handles repeater station ID using either CW or voice, activates the transmitter at the appropriate times, and sometimes performs many other functions depending on the sophistication of the repeater. Some also have a DVR (Digital Voice Recorder) for announcements and messages. The controller is a small computer that's programmed to control a repeater.

### What is Offset?

In order to listen and transmit at the same time, repeaters use two different frequencies. One for its transmit frequency and another for its receive frequency. On the 2 meter ham band these frequencies are 600 khz (or 600 kilohertz) apart. On other bands, the offsets are different. As a general rule, if the output frequency (transmit) of the repeater is below 147 Mhz, then the input frequency (listening) is 600 kilohertz lower. This is referred to as a negative offset. If the output is 147 Mhz or above, then the input is 600 kilohertz above. This is referred to as a positive offset.

# LONDON BRIDGE AMATEUR RADIO ASSOCIATION, INC.

**DUES INVOICE** - (Please fill out the bottom part of page for new and/or changes in your information.)

Dues are payable January 1st and are delinquent February 1st of each year as follows:

(Circle One)

Active (Licensed): \$24.00/year  
Family (Same Household): \$36.00/year  
Associate (Non-Licensed): \$12.00/year

New member dues will be prorated for partial year membership (1/12 of dues for every month remaining in the year), and will be billed for the following year during the month of December.

Please make checks payable to: LBARA

**Send this page and your check to: London Bridge Amateur Radio Association**

**P.O. Box 984**

**Lake Havasu City, AZ 86405-0984**

Signature: \_\_\_\_\_ Date: \_\_\_\_\_

## INFORMATION AND MEMBERSHIP APPLICATION

(Please Print - Use this portion for new and/or changes in your information.)

Name (Last): \_\_\_\_\_ (First) \_\_\_\_\_

Call: \_\_\_\_\_ Class: \_\_\_\_\_ Expiration Date: \_\_\_\_\_

Spouse Name: \_\_\_\_\_ Birthday: \_\_\_\_\_

Call: \_\_\_\_\_ Class: \_\_\_\_\_ Expiration Date: \_\_\_\_\_

Phone: \_\_\_\_\_

Address: \_\_\_\_\_

City: \_\_\_\_\_ State: \_\_\_\_\_ ZIP: \_\_\_\_\_

Mailing Address \_\_\_\_\_

City: \_\_\_\_\_ State: \_\_\_\_\_ ZIP: \_\_\_\_\_

Email Address: \_\_\_\_\_

ARRL Member (Circle One): Yes No

Would you be willing to furnish radio assistance in an emergency? (Circle One) Yes No

Would you be available for Club participation in community events, parades, etc.? (Circle One) Yes No

Comments and/or ideas (activities, guest speakers, programs, etc.) \_\_\_\_\_

\_\_\_\_\_

# **WANT TO IMPROVE YOUR 160/80M SIGNALS? TRY THIS.**



It's well known that the bigger and higher the antenna, the better results you'll get. The new 3-element 160m antenna at **OH8X** must be about as big as you can get. Look out for a strong signal from them during 2009. The new antenna for the 160m Amateur Radio band was completed just in time for Christmas on 24th December after OH8SR and OH6RM had spent three weeks installing it. The Arcala Extremes station OH8X is located at Arkala 65.18N, 26.24E.

### **SYSTEM SPECS**

**Tower Height: 330'      80M Beam: 300'      160M Beam: 270'**  
**160M Gain: 12.0dBi @ 26 degrees**  
**80M Gain: 15/7 dBi @ 12 degrees**  
**Front -to-Back: 160M: 20-30 dB, 80M: 20dB**  
**Elements: 160M: 190'    80M: 140'**  
**Boom: 160M: 215'    80M: 200'**  
**Gross Weight: 80,000 #**



Martti, OH2BH, with the rotator gearbox



You can walk inside this boom!



Element to Boom Joint



The Tower Base

**Are you looking to upgrade your license?**

**Give our VE Exam Team a call.**

**See Ed Gillespie, AB7EM at #453-7412**

# FOR SALE/TRADE

(How to...from page 4)

Virtually all ham radios sold today set the offset once you have chosen the operating frequency automatically. Example: If the repeater output is 146.840 Mhz. The input, or the frequency it listens on is 146.240 Mhz ( 600 kilohertz below). If you have your radio tuned to 146.840 Mhz, (the repeater's output frequency), when you push the mic button, your radio automatically transmits on 146.240 Mhz, 600kc's down from 146.840. When you release the mic button to listen, your radio switches back to 146.840 Mhz to listen on the repeater's output frequency. Note: There are exceptions to the rule so check local repeater listings.

## Standard Repeater Input/Output Offsets

Band	Offset +/-
6 meters	1 MHz
2 meters	600 kHz
1.25 meters	1.6 MHz
70 cm	5 MHz
33 cm	12 MHz
23 cm	20 MHz

Continued  
In The  
March Is-  
sue of the  
Static

## LBARA OFFICERS AND DIRECTORS

Jerry France	President
	Vice-President
Reiner Schick	Treasurer
Lyle Sibbald/Lyle Ross	Secretary
Dick Jernigan	Director (2 YR)
Mike Burson	Director (2 YR)
Jim Gould	Director (1 YR)
Cliff Baril	Director (1YR)
Russ Nyblom	Sgt-at-Arms
Ed Gillespie	Web Master

## VISIT OUR WEBSITE

[www.lbara.net](http://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](mailto:grf@uneedspeed.net) or [francej@ajsinsurance.com](mailto:francej@ajsinsurance.com).

L.B.A.R.A  
P.O. BOX 984  
LAKE HAVASU CITY  
ARIZONA 86405

# 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](mailto: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](mailto:grf@uneedspeed.net) along with your name and phone number.

