

## INTRODUCTION TO AMATEUR RADIO

Amateur radio is one of the most exciting and popular pastimes in the world. There are over one million "HAMS" operating from every end of the globe. You can "meet" a coal miner in Germany, a housewife in Australia, a missionary in India, or a research scientist in Antarctica ... all without leaving your living room.

The first Ham band starts at 1800 kHz; not far from the top end of the "AM" band. There are nine additional bands available to hams throughout the shortwave (H.F.) portion of the radio spectrum. Unlike "AM" broadcast signals, shortwave signals have the ability to consistently travel great distances. Shortwave ham signals will reflect (refract) off the invisible layer above the earth called the ionosphere. Hams operating on the amateur shortwave bands have the ability to talk all over the world. Beyond the shortwave ham bands lies an area of the radio spectrum called VHF (Very High Frequency). Hams also have special bands that they can talk on in the VHF region, UHF region and even above!

While long distance communications does occasionally take place on the VHF ham bands, these bands are usually used for local communications. Many hams have portable ("walkie-talkie") or mobile VHF radios to talk to other hams in their local area using "repeaters" to extend range. Above the VHF portion of the radio spectrum lie still higher frequencies. Hams have additional bands in this region. Hams use UHF for local contacts, transmission of TV signals, satellite communications and experimentation.

Hams use several methods to communicate with each other. When ham radio began all hams utilized Morse code. Morse remains a popular mode among amateur radio operators. Transmission by Morse code is an efficient, reliable and fun way to contact distant stations. Morse code operators use a set of standard abbreviations and procedures that virtually eliminates the language barrier. TNX FOR QSO OM ES 73 means "thank you for the contact and best wishes" in any language! Hams also operate "phone" (voice). On the shortwave bands, hams use a special transmission mode called "single side band" or SSB to transmit greater distances and more efficiently use their allocated frequencies. A third method that hams use to communicate is called radioteletype (RTTY). This mode requires extra equipment. In order to communicate by RTTY, each operator previously had RTTY equipment which roughly resembled a typewriter. Today personal computers can be adapted for RTTY work. In this mode the hams simply type their messages back and forth. A new mode called Packet permits the high speed interchange of messages, data and programs between hams. Data modes such as PSK31 and JT65 can even transmit text messages during marginal conditions. Hams can even send pictures back and forth to each other over great distances! These modes are referred to as slow-scan TV (SSTV)

and facsimile (FAX). But this is only the beginning! There are several special (US, Japanese and Russian) satellites circling the earth that hams can use. Hams transmit their signal into the satellite, then the satellite retransmits the signal back to earth, thus extending the "range" by a factor of 1000+! Some hams even use the moon to bounce their signals to a distant ham! The International Space Station has an amateur radio station aboard. Occasionally the *International Space Station* carries a crew member who is a ham. NASA allows astronaut hams time to communicate with their earth-bound fellow hams! Imagine the excitement of talking to the *International Space Station* as it passes overhead!

There are many aspects of amateur radio ... truly something for everyone! Many amateurs like to experiment (or just tinker!) with various antennas or circuits, others enjoy talking to distant stations (called working "DX"). Still others prefer to communicate with other local hams or experiment with the transmission of text or pictures.

You will meet many people through amateur radio. There are hams from every walk of life and every age. Many famous people are also hams including: Walter Cronkite, Ronnie Milsap, Joe Walsh, Patti Loveless, Priscilla Presley, Gary Shandling, Marlon Brando, Chet Atkins, Tony England, Owen Garriott, Joe Rudi and Art Bell.

Amateurs do more than communicate for pleasure and relaxation. In any civil emergency, where communications are disrupted, amateur radio operators are the first on the scene with trained people and reliable communications channels both locally and to remote locations. Emergency organizations like ARES (Amateur Radio Emergency Service) are groups of ham operators who volunteer themselves and the use of their equipment for county and community emergencies. They work with the Red Cross, Disaster Services, and the Federal Emergency Management Agency as well as local health, welfare and safety agencies. Examples of recent events where hams have provided important services are: the California earthquake and hurricane Katrina. Hams also provide communications for marathons, road rallies, charity drives and similar civic activities. Amateur operators also work closely with weather bureaus to spot tornados and report severe weather.

There are over 1.6 million hams worldwide, operating from nearly every country on earth. In the U.S.A. alone there are over 700,000 amateurs. Amateur radio operators are required to obtain a license from the government before talking on the air. Getting your first amateur radio license is not difficult. Effective April 15, 2000 the license structure for new American hams became simplified and the code requirement reduced or eliminated from some licenses. In late 2006 the Morse code requirement was completely dropped for *all* license levels!

### TECHNICIAN LICENSE

The Technician Class is the entry level VHF-UHF

class. This license offers great privileges and requires passing a 35 question multiple choice written test. No code proficiency is required! This test is administered by qualified volunteer examiners in your area several times a year. When you pass this test you will be granted full use of all the VHF (and higher) ham bands in any mode ... including voice! A technician license will permit operation on the popular 144 MHz band, called 2 meters. A variety of inexpensive mobile and handheld 2 meter radios are available. Most cities have 2 meter "repeaters" sponsored and maintained by local amateur clubs. The repeater antenna is usually on a tall building or tower. A repeater takes an input signal and then rebroadcasts it, substantially increasing the effective range of your radio! Many repeaters also have "auto-patch" capability to make phone calls from your car or walking down the street. The technician license will even allow you to operate through the new generation of ham satellites (which act like repeaters!) giving you worldwide range on VHF!

### GENERAL LICENSE

The general class "ticket" is the most popular class of license. This level requires a 35 question multiple choice written test. There is no longer a code requirement. The general "ticket" dramatically expands your operating privileges! You now can operate all modes on all ham bands including voice on *all* the shortwave (HF) phone bands for global communications. Many hams find the privileges of the general class adequate and do not seek to upgrade to the extra license.

### EXTRA LICENSE

There are special band segments reserved for holders of the extra class license. Another written 50 question multiple choice exam is required for the prestigious extra class.

### GETTING STARTED

There are several ways to get your first license. Universal has a variety of books to help you learn the "theory" of ham radio.

Many prospective hams buy a communications receiver (or transceiver) while they are studying for their "ticket". Universal has a nice selection of new and used receivers. A good receiver may be helpful for several reasons. You will be able to listen to other amateurs, and start to learn the "language" and "buzz-words" of ham radio. Getting your first station on the air doesn't have to be expensive! Universal has a nice selection of inexpensive used equipment. Amateur radio equipment does not require any special wiring in your home. Antennas can be large, expensive and elaborate, or simple, unobtrusive and inexpensive. Many new general class hams string up a "dipole" antenna which can be purchased for about \$45. You are now ready to begin the lifetime adventure of amateur radio.

A couple of helpful websites to visit are:

[www.ARRL.org](http://www.ARRL.org)  
[www.DXing.com](http://www.DXing.com)