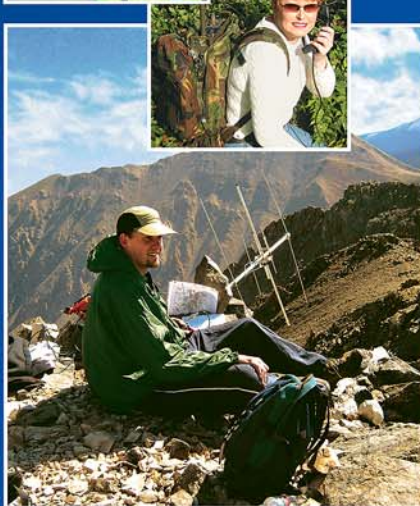


NOW New Opportunities for EVERY Ham!

Making the most of your Amateur Radio experience.
Get on the air!



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Welcome to the fascinating world of high frequency (HF) radio!

HF, often called "short wave" radio, is the part of the radio spectrum where the ionosphere typically supports long-distance communication. We say "typically" because the effect of the ionosphere on radio wave propagation is constantly changing, literally moment by moment. For a radio amateur, learning to use this unique natural phenomenon to communicate across the country and the world is similar to a sailor learning to use the wind and the currents to travel from port to port. It is possible to get anywhere in the world by radio, with fairly simple equipment and antennas, once you know how to "navigate"!

The FCC's decision to eliminate the Morse code examination as a licensing requirement opens the door to HF for all amateur licensees. For Technicians the door is open just a crack, offering SSB voice, RTTY, and data privileges in parts of the 10-meter band and CW privileges in parts of the 10, 15, 40 and 80 meter bands. However, if you are a Technician licensee, upgrading to a General license—which conveys much more extensive HF privileges—now only requires passing a written examination. Once you do, the entire range of operating modes and 86.7% of the amateur spectrum below 30 MHz become available to you. Passing the written examination for the Amateur Extra Class license unlocks to the door to the remaining 500 kHz.

The ARRL staff has assembled this eight-page supplement to the March 2007 issue of *QST*, the ARRL's membership journal, to introduce our growing community of radio amateurs to the exciting world of HF radio. If you are not yet a member of the ARRL, please consider this an invitation to join us. **See you on the bands!**

Sincere 73,

David Sumner, K1ZZ
Chief Executive Officer, ARRL



ARRL The national association for
AMATEUR RADIO

Time to Roll Up Our Sleeves and Mentor!

Invite! Inform! Inspire! Involve!

Norm Fusaro, W3IZ
ARRL Affiliated Club & Mentor
Program Manager

Opportunities abound for all US radio amateurs in the wake of the recent changes to the Amateur Radio Service rules. The new licensing requirements, along with changes in band allocations, demonstrate our ability to adapt to a changing world, as we've done for 100 years. What has not changed during this century of ham radio is the passion hams have for Amateur Radio and our willingness to help each other.

So What's Different?

Quite a bit, actually. The FCC's recent changes to the Amateur Service rules (those relating to operating privileges) can be summarized this way:

- **Morse code:** The FCC no longer requires that those taking an Amateur Service exam demonstrate Morse code proficiency. You can of course still use code on the CW subbands, and thousands of hams will continue to do so, but you don't need to prove you know it.
- **Expanded privileges for Technicians:** Technicians can now operate CW on the frequencies formerly reserved for Technician Plus licensees — 3525-3600 kHz on the 80 meter band; 7025-7125 kHz on 40 and 21,025-21,200 kHz on 15.
- **Expanded 10 meter privileges for Technicians and Novices:** Technicians and Novices can now use CW/RTTY/Digital from 28,000-28,300 kHz. As was the case previously, Technicians and Novices can use CW and phone on the 28.300-28.500 kHz subband.
- **Expanded phone bands:** The phone subbands have been expanded on the 80, 40 and 15 meter bands. As was the case before, your license class determines where you can operate. The band chart on the last page of this special section provides the details.

Our Chance to Welcome Newcomers

As we mark these milestones, two things remain constant in our rich heritage — the desire to communicate and to help others. Mentoring has long been a vital part of the fabric of Amateur Radio. So much so that



Nothing pleases new hams more than a small certificate commemorating his or her very first two-way contact. That's where the ARRL's First Contact Award enters the picture.

hams have even coined a term — *Elmer* — for the person who teaches and nurtures the neophyte operator. Almost all hams have had at least one Elmer in their Amateur Radio life and many have had the privilege of being an Elmer to a new ham. Regardless of your personal position on FCC's recent changes, the debate is over and as a community we now have an extraordinary opportunity to mentor newcomers and hams who will be enjoying new privileges.

In addition to new voice privileges on the HF bands, many operators will be exploring CW, radioteletype (RTTY) and the data modes. Because some of the newer data modes did not exist even as little as a few years ago, mentoring will be a two-way street — in some cases, the teacher will also be the student. As some hams discover the art of sending and

certificates are suitable for framing and are free to ARRL members and Affiliated Clubs. Send your request to clubs@arrl.org.

The Four "I's": Invite, Inform, Inspire, Involve

Invite people to your club. License test sessions are a good place to extend an invitation to visit your club. Some clubs have had great success holding an open house for new or prospective hams. ARRL Affiliated Clubs have access to information on new and recently upgraded hams in their area. This information is updated monthly on www.arrl.org/members-only/NEAM/.

Talk it up on the local repeater but remember that when you are using the club repeater prospective members may be listening. Avoid derogatory or negative statements or terms that tend to segregate.

Inform club members and the new operators about ham radio. With all of the new rules changes there are going to be plenty of questions and people who will be curious about some operating mode they have not yet experienced. If you have a passion for a particular segment of Amateur Radio then by all means share your enthusiasm. At the same time, you'll want to be respectful of others and their enjoyment of the hobby.

Inspire new hams to become active on the air and in your club. Developing good communication skills is only part of the Amateur Radio mentoring process. Organizational talent and other skills are needed to maintain a healthy and active club.

Inviting all hams to participate is very important. It doesn't matter which path a person took to get into ham radio. What really matters is what that person does once they have become a ham. We should all take advantage of the enthusiasm that a new ham brings to the party and get them involved in the club and other radio activities.

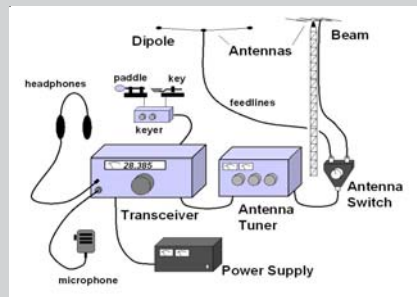
While the revision to the Morse requirement may be the most talked about change, the new band allocations are equally significant. With the exception of authorizing five channels in the 60 meter band for amateur use in 2003, the amateur spectrum has not been significantly changed since the early 1980s, when hams were granted privileges on the 12, 17 and 30 meter bands.

Looking for mentoring resources? You'll find a slew of them at www.arrl.org/mentor.

It's Up to Us

The new changes in the Amateur Radio Service are not going to create an influx of new hams overnight, nor will all those hams who found Morse code a barrier instantly upgrade their licenses. What is likely to occur is that after a spike in license upgrades many others will begin to investigate ham radio and what it may offer them. It is up to us, the very experienced and not so experienced operators, to reach out to new hams and offer them an old-fashioned welcome to the Amateur Radio of the Twenty-First Century.

What Kind of Gear Do I Need ?



This is a slide from just one of the many presentations available to Elmers on the ARRLWeb. All are available for free download. This one is from "HF 101: 30,000 kHz and Down," by Ward Silver, NØAX.

receiving Morse code, some will stumble, just as all of us who took a traditional path into ham radio stumbled from time to time.

Regardless of the mode in question, mentoring a new ham should always be done with a positive spin. The goal of mentoring is to develop good, effective communications skills and to nurture courteous and safe operating practices. If you find yourself in a position to help a ham with their new privileges or engage someone on the air, remind yourself that we all had a first day on the job and that somebody was there to guide us.

Mentoring can be a club function as well as an individual effort. The ARRL multimedia library (www.arrl.org/multimedia) offers programs that can be used at club meetings or in a private session. These materials are free to download and many have accompanying handout material to make a complete presentation. Some of the many topics include introduction to HF radio, DXing and contesting, HF mobile operating, traffic handling and QSL cards.

The ARRL has a beautiful Elmer Award that can be a means of recognizing someone for being a mentor. You can also make a new ham's first contact special by giving them a First Contact Certificate. Both of these

The ARRL Volunteer Exam Coordinator

We'd like to help you earn your new license or upgrade.

Maria Somma, AB1FM
ARRL VEC
Department Manager

We provide instruction and support for everyone seeking to become licensed and licensing assistance and procedures for amateurs seeking upgrades, regardless of where in the US you may live (some sessions are provided overseas as well).

Test Locations

To find out where an exam is being conducted in your area, take a look at www.arrl.org/examsearch (or give us a call at 860-594-0300 or drop us a note c/o ARRL Headquarters). We can send you a computer printout of the tests scheduled in your area or provide the information over the phone.

Can't find an exam scheduled for your area? We'll locate nearby VEs to arrange a future exam.

Next step is to choose a test site from the information provided and call the Test

Session Contact Person for that test session. He or she will supply you with the essential information about the test session: directions to the exam; what time you should arrive, what you should bring with you and how long the test is expected to last. The Contact Person can also answer any other questions you may have.

The FCC allows VECs (or VEs) to charge a test fee to overcome out-of-pocket expenses. The test fee is based on postage, printing and duplicating costs. For 2007 the ARRL VEC test fee is \$14. The cost is the same—\$14—whether you take one or all of the written tests at the session. Check with your local Volunteer Examiner (VE) Team regarding test fees.

Can I Use My New Operating Privileges Immediately?

Just earned your first license? You'll need to wait a bit before transmitting with your new privileges — until the FCC "grants" your call

sign and your license appears in the FCC database.

Already have a license? If so, you can use your newly upgraded privileges immediately. When you pass your exam, the VEs will give you a Certificate of Successful Completion of Examination. If you've earned an upgrade, that CSCE will indicate what license class you have upgraded to. The FCC will then "grant" your upgrade and update their database.

Facts and Figures

The ARRL Volunteer Examiner Coordinator can help you obtain and upgrade your license and thereby enhance your enjoyment of Amateur Radio. Since 1984, we've been busy meeting the needs of the Amateur Radio community.

To give you an idea of what the ARRL VEC has been up to, here are a few statistics: In the first 22 years, we have accredited more than 50,000 Examiners. These VEs have conducted more than 90,000 test sessions. At these sessions, more than 850,000 individuals have taken examinations to earn a license or to upgrade their license privileges. And out of those, 400,000 have had their successful applications submitted to the FCC for new and higher class licenses.

Yes, we've been busy!

American Radio Relay League VEC
Certificate of Successful Completion of Examination

Test Site: _____ Test Date: _____
(City/State): _____

CREDIT FOR ELEMENTS PASSED VALID FOR 365 DAYS
You have passed the telegraphy and/or written element(s) indicated at right. Your will be given credit for the appropriate examination element(s), for up to 365 days from the date shown at the top of this certificate.

LICENSE UPGRADE NOTICE
If you also hold a valid FCC-issued Amateur radio license grant, this Certificate validates temporary operation with the operating privileges of your new operator class (see Section 97.303 of the FCC's Rules) until you are granted the license for your new operator class, or for a period of 365 days from the test date stated above on this certificate, whichever comes first. Note: If you hold a current FCC-granted (codeless) Technician class operator license, and if this certificate indicates Element 1 credit, this certificate indefinitely permits you HF operating privileges as specified in Section 97.301(e) of the FCC rules. This document must be kept indefinitely with your Technician class operator license in order to use these privileges.

LICENSE STATUS INQUIRIES
You can find out if a new license or upgrade has been "granted" by the FCC. For on-line inquiries see the FCC Web at <http://www.fcc.gov/electronic/fccsearch> ("Search Licenses" tab), or see the ARRL Web at <http://www.arrl.org/fcc> or by calling FCC toll free at 888-225-5322, or by calling the ARRL at 1-860-594-0300 during business hours. Allow 15 days from the test date before calling.

THIS CERTIFICATE IS NOT A LICENSE, PERMIT, OR ANY OTHER KIND OF OPERATING AUTHORITY IN AND OF ITSELF. THE ELEMENT CREDITS AND/OR OPERATING PRIVILEGES THAT MAY BE INDICATED IN THE LICENSE UPGRADE NOTICE ARE VALID FOR 365 DAYS FROM THE TEST DATE. THE HOLDER NAMED HEREON MUST ALSO HAVE BEEN GRANTED AN AMATEUR RADIO LICENSE ISSUED BY THE FCC TO OPERATE ON THE AIR.

Candidate's Signature _____ Call Sign _____
Candidate's Name _____ (if none, write none)
Address _____ State _____ ZIP _____
City _____

VE #1 Signature _____ Call Sign _____
VE #2 Signature _____ Call Sign _____
VE #3 Signature _____ Call Sign _____

EXAM ELEMENTS EARNED

Passed written Element 1
Passed written Element 2
Passed written Element 3
Passed written Element 4
NEW LICENSE CLASS EARNED
TECHNICIAN
TECHNICIAN w/FP
GENERAL
EXTRA

COPIES: WHITE—Candidate, BLUE—Candidate, YELLOW—VE Team, PINK—ARRL VEC



Looking to Earn your Ham Radio License? Want to Upgrade? Here's How to Do It

Your Current License	Test	Primary ARRL Resources that will Get You to Your Goal
Not yet licensed	Technician	<i>The ARRL Ham Radio License Manual, ARRL's Tech Q&A, online ARRL Ham Radio Technician License Course</i>
Novice	Technician	<i>The ARRL Ham Radio License Manual, ARRL's Tech Q&A, online ARRL Ham Radio Technician License Course</i>
Technician	General	<i>The ARRL General Class License Manual, ARRL's General Q&A</i>
Technician Plus	General	<i>The ARRL General Class License Manual, ARRL's General Q&A</i>
General	Extra	<i>The ARRL Extra Class License Manual, ARRL's Extra Q&A</i>
Advanced	Extra	<i>The ARRL Extra Class License Manual, ARRL's Extra Q&A</i>

For more information, see www.arrl.org/study.

The Top 10 Reasons to Try Morse Code

If you still need a reason to get on CW, here are 10 of them!

Rick Lindquist, N1RL
ARRL Senior News Editor

Morse code — CW — has been an integral part of Amateur Radio from the start, and some stalwarts still consider it “the essence of ham radio.” Bottom line: A substantial segment of the world’s ham radio community still enjoys CW, and you can too...if you so desire.

If you hold a Technician ticket, you can join the fray on 80, 40, 15 and 10 meters. You’ll meet new friends and enjoy a special sense of accomplishment in the bargain. To help spread the enthusiasm, and with apologies to David Letterman, we offer our Top 10 reasons to try CW.

10. It’s a New Way to Communicate

MFJ Founder and President Martin F. Jue, K5FLU, says he prefers CW “because it’s so different from all the other ways I communicate.” A CW chat is a welcome diversion at the end of a day filled with meetings, e-mails, power lunches, phone calls and other forms of hard work.

9. Age is No Barrier

While many old-time hams enjoy Morse code, youngsters seem to have a particular fascination for it. They love hearing the beeps and learning how to send their names. As with most languages, it’s easier for youngsters to learn Morse code. Added bonus: When you’re a youngster on CW, no one will know your voice hasn’t changed!

8. It’s a “Minimalist Mode”

CW is simplicity itself. A basic transceiver and antenna and some way to turn the transmitted signal on and off to create Morse characters is pretty much all you need. It’s also the preferred mode for low-power (QRP) aficionados running no more than 5 watts, for those who like building their own gear and for those who enjoy heading for the hills (or campsite or canoe) to do ham radio.

“Why CW?” asks Charlie Geib, N4AV. “For one thing you get more bang for the buck. CW will get through when voice is long gone.”

Radio amateurs send CW using keys or keyers. A key is simply an on-off switch. (How simple is *that*?) There’s no best sending method, although touching two bare wires together would be dead last on my list. A straight (or “hand”) key often is the initial Morse instrument of choice.

After they’ve gotten some experience, most CW operators nowadays graduate to an electronic keyer and paddle. An electronic keyer and paddle can send an infinite series of perfectly spaced dits and dahs. Many modern transceivers have built-in keyers that can function in semi-automatic (“bug”) and automatic modes.

7. You’ll Know Something Most People Don’t

Think you’ll have trouble learning the code? You’re not alone — even some of us who passed our first CW tests long ago were reluctant learners.



“I didn’t want to learn CW,” Geib admits. “I just wanted to ‘talk.’ Bottom line, though, it’s just putting in the time listening and copying.”

Can you *get around* learning the code? Sure, but you’ll miss an important ingredient of the CW experience. There are products on the markets that decipher CW characters on a built-in display. Some successfully use computers to receive and send CW.

Pete Riker, K4BKD, has operated his share of both phone and CW since getting his license in 1959, and he prefers CW the old-fashioned way. “I have tried computer copying, but a very slight difference in spacing can produce unexpected results,” he says. “The human ear can overcome such shortcomings.”

Learning to copy code doesn’t happen overnight, a potential downside in this instant on/immediate gratification era. Like other skills, from singing to skateboarding, it takes practice.

6. It’s Like Text-Messaging Without the Monthly Bill

Morse code is yesterday’s text messaging, but better. A lot of the shorthand is even the same. Ham radio doesn’t require any infrastructure, and typical CW speeds far exceed text-messaging throughput.

During a May 2005 face-off between Morse code and text messaging on *The Tonight Show with Jay Leno*, two ham radio operators using CW won hands down (no pun intended).

5. Morse Makes You Use Your Head

Most start copying code by writing down every letter they hear, gradually advancing, along with code speed, to copying “in the head.” Riker says this talent serves him well, especially when he’s operating CW on the fly from his car.

“When you operate CW enough, it’s like a second language, and you begin to think in it,” he points out. Riker offers these tips for newcomers:

- Listen to contacts (QSOs) on the air that you can copy. Get a feel for what’s being said.
- Schedule your first contact with a friend. This helps build confidence and overcome the jitters.
- If you’re extra brave, try calling CQ. The “3x3 CQ” works great: CQ, CQ, CQ de K4BKD K4BKD K4BKD K.
- If someone comes back, *don’t panic!* Wipe off the sweat and return the call: N1RL de K4BKD . . .
- Follow a contact “formula”: Send signal report (RST), location (QTH) and name, each just *once*, then toss it back. The other station likely will respond in kind.
- Don’t be afraid to ask the other station to slow down (QRS) if necessary. A good CW operator will be happy to comply — and be pleased to be your first contact.



Pete Riker, K4BKD, shown in his Marietta, Georgia, ham shack, was first licensed in 1959, and has operated CW ever since.

4. CW Has a Low Profile

You don’t need a “Big Gun” station to have fun with CW. The most complicated thing you might need is an additional IF filter for your transceiver.

Equipped with a set of headphones, you needn’t worry about disturbing the entire household. CW operation can be *real* quiet — often an asset to domestic tranquility.

You also can get away with less-than-optimal antennas. “Many hams who have to use compromise antennas, perhaps due to deed restrictions or limited space, use CW, as it’s easier to make contacts,” Riker observes. And quieter too.

3. There’s No Language Barrier with Morse Code

If there’s a “world language,” it’s Morse code. “The Q signals are internationally recognized,” Geib points out, “and it makes it so much easier to talk with people around the world who don’t speak your language.”

Q signals are three-letter abbreviations all (surprise!) starting with the letter “Q.” We’ve used a few already. For example, QTH = location. QTH? = What is your location?

2. It’s a Great Way to Work Distant Stations

After earning my Novice ticket, I couldn’t wait to upgrade and get on ‘phone. When I got my General, however, I soon found myself gravitating back to CW, because it was a lot easier to work DX (or just about anyone) on CW. Contacts simply out of the reach of my modest setup were within my grasp on CW.

As Riker sees it: “You can work stations with less power, and there’s no language and accent barrier to contend with.”

1. You’ve Already Got CW Privileges

No matter what class of license you hold, you *now may operate on HF*, whether or not you’ve passed a Morse code test!

The allocation chart elsewhere in this special section spells out the operating privileges you have, depending on your license class. Technicians gaining HF privileges for the first time will find they may operate only CW on three of those bands. Take advantage of the opportunity — you’ll never look back.

Qualify for Ham Radio Awards Instantaneously — with LoTW

You'll find Logbook of The World to be an invaluable resource.

Dave Patton, NN1N
Membership & Volunteer Programs Manager

The lure of operating on the high-frequency bands is undeniable. Whatever mode you choose, the idea of making contacts with other hams all over the world without "wired infrastructure" is a longstanding and forever enjoyable facet of Amateur Radio.

Once the contacts start filling the logbook, for many operators the next step is to start recordkeeping — and "checking off" a list of all those places on Earth where you've made contacts. As the checklist grows and you start to learn about all the great operating awards that are available, you'll naturally start thinking about confirming these contacts.

Confirming both sides of a QSO has a long, rich tradition with the exchange of QSL cards. The purpose of the QSL? Simply to say, "Yes, it really was I that you had a QSO with and I was operating from here." Hams use the QSL cards as the basis for applying for awards, in essence to show the award sponsor that you did make those contacts and have achieved the requirements needed to earn the award. Many hams also enjoy collecting colorful and unusual QSL cards.

The Long Wait

Until recently it took a long time to qualify for an award — mostly time spent waiting for the traditional QSLing process to work. Some time could be shaved off the process, at large cost, by sending your QSL cards directly to those you've contacted and hoping for an expedient response. QSLs sent via the ARRL Outgoing QSL Bureau are shipped regularly, by surface mail. The QSLs *will* get to their destinations, and you may well receive a card in return from your Incoming Bureau, but it's a slow (if time-honored) process.

Today, another option is unfolding — ARRL's Logbook of The World (LoTW).

A Faster Alternative

Logbook of The World is a repository of log data that uses custom software at ARRL to create confirmed QSOs. It does this by comparing the log data you've uploaded against log data others have uploaded. Because of the nature of the process — using digital signatures in a public key infrastructure — the matches are considered "trusted" and valid for awards purposes.

LoTW gives users a new alternative to accompany the traditional collecting of QSLs



by providing a much lower cost, speedy and enjoyable way to work toward awards. LoTW can be viewed and managed by individual users on the LoTW Web page, or managed through impressive third party integration with many commercial logging programs.

If you're an ARRL member, you can earn a wide variety of operating awards. LoTW can currently be used to apply for the Worked All States and DXCC (100 different entities) awards, and it will continue to expand to support more and more ARRL awards as well as those sponsored by other organizations. Read more about LoTW at www.arrl.org/lotw/.

Which HF Transceiver is Right for You?

Well, that depends on how you intend to use it.

Steve Ford, W8SIMY
QST Editor

The following (edited slightly to focus on HF equipment) is taken from Chapter 1 of the ARRL publication *Getting Started with Ham Radio*. You can find a great deal more on this subject in that book and in other ARRL publications.

The answer to this question depends on how much money you have to spend and what you hope to do with the radio once you buy it. You can spend as little as \$200 and as much as \$13,000!

When in doubt, simplify. It's time for a table...

When reading this table, you'll likely notice the comments concerning receiver performance. When it comes to transceivers, receiver performance is critical to your operating enjoyment. On HF the basic receiver requirements are much the same as for VHF/UHF FM, but interference is usually worse and the desired signals can be much weaker. Combine this with noise from Mother Nature (static crashes) and you have a challenging reception environment indeed! For casual chit-chat operating, just about any HF transceiver will do the job. It's when you begin hunting for weak signals, or operating in contests, that receiver performance becomes particularly important.

The ancient axiom "you get what you pay for" is as true in Amateur Radio as it is anywhere else. You can save a bundle of money with a low-end transceiver, but don't expect high-end receiver performance.

The best approach to sorting out your transceiver options is to become a member of the ARRL so that you'll receive *QST* magazine each month with its detailed Product Reviews (and have access to the ARRL online Product Review archives). By carefully studying the *QST* reviews you can make an informed choice, getting maximum "bang" for your buck. Even if you don't fully understand the Product Review measurement results, look for the key results table. This graphic will tell you how the radio performed in all the areas that matter most.

Transceiver	Pro	Con
HF only; "low end" (\$500 to \$700)	Powerful, yet moderately priced	Limited features; mediocre receiver performance
HF + 6 meters; "high end" (\$2000+)	Excellent receiver and many features	Expensive and bulky
DC to Daylight (\$700 to \$1700)	Every band and mode you'll probably ever want	Receiver quality can vary; pricey for a starter radio

HF Propagation: The Basics

When's the best time to check out the high-frequency bands for those globe-spanning contacts you've been hearing about from long-time hams? Now!

Joel P. Kleinman, N1BKE
Managing Editor, *QST*

Up for a challenge? You could try working distant stations (DX) from the peaks of each of the highest mountains on each continent. (Bring oxygen.) Or you could try your hand at earning a DX Century Club certificate by working 100 different entities starting now... near the bottom of the sunspot cycle...using low power.

Those just getting their feet wet on the HF bands will more than likely pass on the opportunity to pursue either of those two challenges, preferring to buy a transceiver, throw up an antenna and listen to the bands to see what's out there.

Cycling through Sunspot Numbers

What's *not* out there for the time being are sunspots. What's the big deal about sunspots? Simply put, the number of dark blotches on the surface of the sun has a direct effect on how HF signals travel. When we're sitting pretty at or near the top of the 11 year sunspot cycle, as we were in 2000, we're able to hear and work distant stations on 160 through 10 meters pretty regularly — even with less than ideal antennas and low power.

Does that mean you should stick to your local 2 meter repeater until the sunspots hit

their peak again in 2011 or so? Nope. The good news is that while the number of sunspots does affect our ability to work DX, many other factors come into play. Take 10 meters. Just when you think it should be declared officially dead, it can spring to life and provide short periods of propagation over 2000 mile paths.

Some DX openings are predictable, but some aren't. Whether you can talk to New Zealand or your buddy across town (or to no one!) at any particular time depends on a number of factors:

Frequency: VHF, UHF and microwave energy often travels via line of sight — you'll reach as far as your antenna can "see." RF energy at these frequency ranges can also travel longer distances, under the right circumstances. At HF, signals can also travel via ground wave. But they often take a circuitous route, bending back to Earth after reaching a layer of the ionosphere, sometimes several times.

The sunspot cycle: Scientists discovered hundreds of years ago that the number of dark blotches on the surface of the sun increase and decrease in an approximate 11 year cycle. Once hams started making long distance contacts, it didn't take long to correlate the number of sunspots with HF propagation: the more sunspots, the better the propagation.

Time of year: Depending on the season (at your location as well as the location you're attempting to reach), you may have a better chance of making contact, or it may be slim to none.

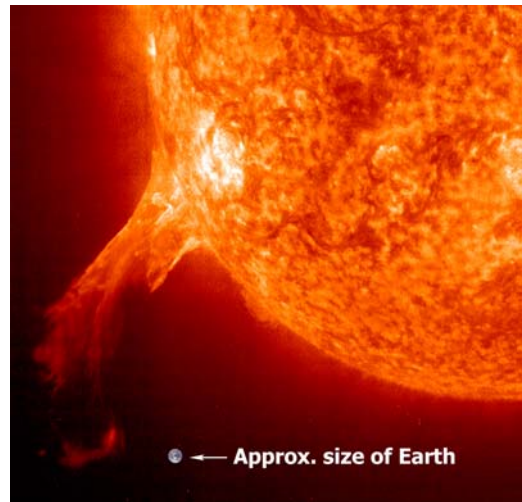
Time of day: During daylight, most radio-frequency energy at 80 and 40 meters is absorbed by the D layer of the ionosphere. At night, those bands often come to life, as signals travel by skywave propagation. When signals are able to refract back to Earth one or more times, they can be heard many thousands of miles away.

The Bands

Let's take a closer look at the 80, 40, 15 and 10 meter HF bands, the bands affected by the recent regulatory changes. Please note: Your results will vary. These general guidelines are just that — general guidelines. Openings, sometimes to exotic locales, can and do occur on bands and at times you wouldn't expect.

80 Meters: Heavy Lifter of the Low Bands

You'll find that 80 meters (3.5 MHz) is the nighttime king of the HF bands in these times of low sunspot numbers. During the day, the D layer of the ionosphere absorbs much of the RF energy that would otherwise refract back to Earth. You'll find more 80 meter



SOHO-EIT CONSORTIUM, ESA, NASA

An erupting solar prominence from the Solar and Heliospheric Observatory. When solar activity is high, sunspots and prominences like this one are more common. More sunspots means propagation on Earth is enhanced.

openings during the winter than during the summer.

40 Meters: Worth the Challenges

Another low band workhorse, 40 (7 MHz) tends to open during the late afternoon. European broadcasters share part of the band (for now), so it can be a challenge to be heard over the interference. Just for fun, noise from summertime lightning strikes adds to the challenge. Even so, 40 is a prime nighttime band.

15 Meters: It'll be Better

When sunspot numbers are low, 15 (21 MHz) can open briefly after sunrise. When sunspot numbers are high, 15 often provides excellent, long duration openings to exotic locales. Openings can last from sunrise to well after dark.

10 Meters: Your Patience will be Rewarded

For many, there's no more fascinating HF band than 10 (28 MHz); as the highest frequency (and lowest wavelength) HF band, it can be provide openings via several different types of propagation.

When sunspot numbers are low, a type of propagation called *sporadic-E* brings unpredictable and often short contacts spanning 1500-3000 miles. Listen closely and often, and you'll be pleasantly surprised. *Scatter propagation* can produce openings of 400-800 miles, regardless of the sunspot cycle. During high sunspot activity, 10 is a powerhouse. Long-distance skywave contacts are possible just about any time.

Propagation Resources

Want to know which bands are open to where at any particular time? Try tuning in a *beacon station*. The Northern California DX Foundation and the International Amateur Radio Union operate special transmitting stations in various parts of the world as a service to the Amateur Radio community. If you can hear a beacon, you can probably hear a nearby ham radio station. See "Tune in a Beacon Station" by Paul Graziani, W5ZK, in the July 2006 issue of *QST*, and the NCDXF beacons Web site, www.ncdxf.org/Beacon/intro.html.

An article in the same issue, "When Will the Bands Improve?" by Carl Luetzelschwab, K9LA, discusses the departing Sunspot Cycle 23 and the prospects of better conditions to come with the advent of Cycle 24.

Want to read more about propagation? *The ARRL Handbook for Radio Communications*, *The ARRL Antenna Book* and *The ARRL Operating Manual* all have extensive discussions of the art and science of propagation.

The Considerate Operator's Frequency Guide

A guide to where on the HF bands various modes and activities are generally found. All frequencies are in MHz.

The following frequencies are generally recognized for certain modes or activities (all frequencies are in MHz).

Nothing in the rules recognizes a net's, group's or any individual's special privilege to any specific frequency. Section 97.101(b) of the Rules states that "Each station licensee and each control operator must cooperate in selecting transmitting channels and in making the most effective use of the amateur service frequencies. No frequency will be assigned for the exclusive use of any station." No one "owns" a frequency.

It's good practice — and plain old common sense — for any operator, regardless of mode, to check to see if the frequency is in use prior to engaging operating. If you are there first, other operators should make an effort to protect you from interference to the extent possible, given that 100% interference-free operation is an unrealistic expectation in today's congested bands.

Frequencies	Modes/Activities
1.800-2.000	CW
1.800-1.810	Digital
1.810	QRP CW calling frequency
1.843-2.000	SSB, SSTV and other wideband modes
1.910	SSB QRP
1.995-2.000	Experimental
1.999-2.000	Beacons
3.500-3.510	CW DX window
3.560	QRP CW calling frequency
3.570-3.600	RTTY/Data
3.585-3.600	Automatically controlled data stations
3.590	RTTY/Data DX
3.790-3.800	DX window
3.845	SSTV
3.885	AM calling frequency
3.985	QRP SSB calling frequency
7.030	QRP CW calling frequency
7.040	RTTY/Data DX
7.080-7.125	RTTY/Data
7.100-7.105	Automatically controlled data stations
7.171	SSTV
7.285	QRP SSB calling frequency
7.290	AM calling frequency
10.106	QRP CW calling frequency
10.130-10.140	RTTY/Data
10.140-10.150	Automatically controlled data stations
14.060	QRP CW calling frequency
14.070-14.095	RTTY/Data
14.095-14.0995	Automatically controlled data stations

Frequencies	Modes/Activities
14.100	IBP/NCDXF beacons
14.1005-14.112	Automatically controlled data stations
14.230	SSTV
14.285	QRP SSB calling frequency
14.286	AM calling frequency
18.100-18.105	RTTY /Data
18.105-18.110	Automatically controlled data stations
18.110	IBP/NCDXF beacons
21.060	QRP CW calling frequency
21.070-21.110	RTTY/Data
21.090-21.100	Automatically controlled data stations
21.150	IBP/NCDXF beacons
21.340	SSTV
21.385	QRP SSB calling frequency
24.920-24.925	RTTY/Data
24.925-24.930	Automatically controlled data stations
24.930	IBP/NCDXF beacons
28.060	QRP CW calling frequency
28.070-28.120	RTTY/Data
28.120-28.189	Automatically controlled data stations
28.190-28.225	Beacons
28.200	IBP/NCDXF beacons
28.385	QRP SSB calling frequency
28.680	SSTV
29.000-29.200	AM
29.300-29.510	Satellite downlinks
29.520-29.580	Repeater inputs
29.600	FM simplex
29.620-29.680	Repeater outputs

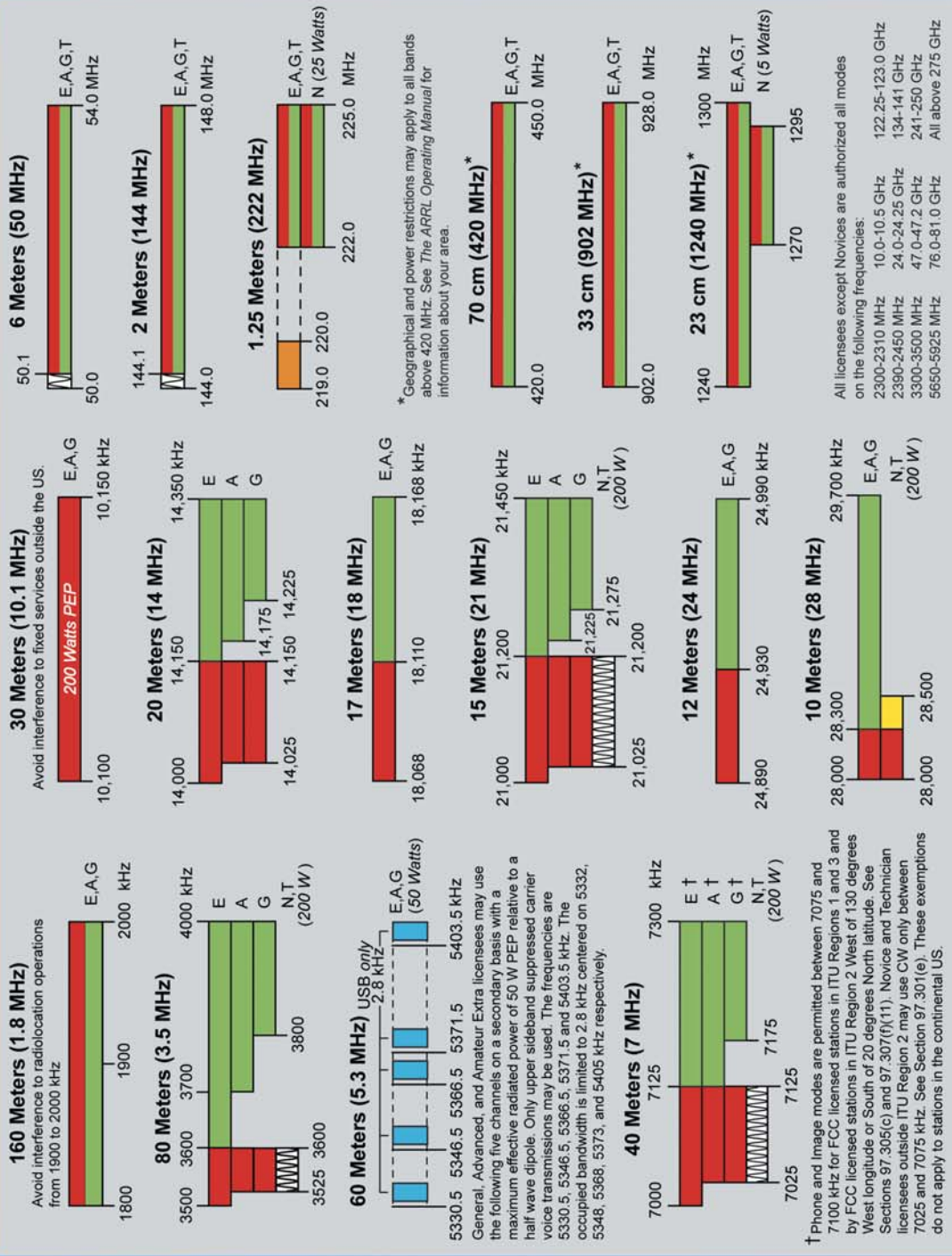
US Amateur Radio Bands

US AMATEUR POWER LIMITS

At all times, transmitter power should be kept down to that necessary to carry out the desired communications. Power is rated in watts PEP output. Except where noted, the maximum power output is **1500 Watts**.

Effective Date
February 23, 2007

The national association for
ARRL AMATEUR RADIO



KEY

Note: CW operation is permitted throughout all amateur bands except 60 meters. MCW is authorized above 50.1 MHz. Test transmissions are authorized above 51 MHz, except for 219-220 MHz

- [Red bar] = RTTY and data
- [Green bar] = phone and image
- [Wavy bar] = CW only
- [Yellow bar] = SSB phone
- [Blue bar] = USB phone only
- [Orange bar] = Fixed digital message forwarding systems only

E = Amateur Extra
A = Advanced
G = General
T = Technician
N = Novice

See ARRLWeb at www.arrl.org for more detailed band plans.
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† Phone and image modes are permitted between 7075 and 7100 kHz for FCC licensed stations in ITU Regions 1 and 3 and by FCC licensed stations in ITU Region 2 West of 130 degrees West longitude or South of 20 degrees North latitude. See Sections 97.305(c) and 97.307(f)(11). Novice and Technician licensees outside ITU Region 2 may use CW only between 7025 and 7075 kHz. See Section 97.301(e). These exemptions do not apply to stations in the continental US.

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