WHAT'S NEXT?

A GUIDE FOR NEW AMATEUR RADIO OPERATORS

COURTESY OF THE ARRL WEST TEXAS SECTION

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Acknowledgement

We would like to thank those individuals and clubs who have prepared introduction guides for new hams to help them get started in this wonderful hobby. We have reviewed several of these guides and encourage more to be developed.

In this guide we have used some information from a document prepared by Ray Lajoie, KB1LRL, Section Manager, Western Massachusetts. Our efforts also include information gleaned from the ARRL and other ham radio sources. We thank Kelly Briarton, KB2RN, for her insight and effort to make this guide meaningful for the new ham!

Introduction

Welcome to Amateur Radio!

You have joined a fascinating hobby … Your Technician license opens up a host of communication venues. The sky is literally the limit of what you can do with ham radio. The opportunities to quench your interest is available in the many different activities in ham radio. Would you like to talk to the astronauts? Use computers to develop and use ham radio programs? Are you wondering about high altitude ballooning? Did you become interested in ham radio to support your community in emergencies and social events? Track family or friends as they drive or hike? The opportunities are endless. For example, you might be interested in Emergency Communications – and that is one of the key functions of Amateur Radio in serving our communities in times of disaster. Your newfound communication skills will also be of use to provide communications for many activities like marathons, bike rallies, traffic control at sporting events or other community functions. If you have a hankering to build some of your own equipment, there are seminars, literature, and local help depending on how deep you want to get involved. If you have a competitive nature, then contesting is for you! There are a variety of contests that are held frequently. Some are held locally, Statewide, Country or Global. You can participate in any or all of them!

There are many more aspects of ham radio too numerous to mention here, but they all have one thing in common … you will probably need a bit of help in learning and initially doing each that you choose. We call folks that are willing to help you advance in ham radio Elmer's, or in new speak… Mentors.

This is exactly what this document is about.

How to Find Technical Resources

How and where do you find assistance? Need help finding someone to answer a question you may have? Or, who may help you out in specific situations?

WE ARE ALL HERE TO HELP YOU!!!

When you are facing a technical issue, it is important for you to define to the best of your ability what is actually happening versus what should be happening. A careful initial evaluation and definition of the problem will greatly aid anyone that may assist you.

This guide will identify a club member or Section specialist that can assist you by providing guidance or hands on assistance or a source for the information needed. This describes the Elmering or Mentoring aspect of the program. Don't be embarrassed if you run into a problem. We've all been there. In no time at all you will be well versed in your station's operation, this comes with practice. We know it certainly helps to have someone guiding your initial efforts. Your local club may be a great resource in finding an Elmer/Mentor. There are also many excellent websites, Facebook groups and YouTube channels for additional assistance.

Who to Contact?

Your assistance will come from different areas depending on what your questions or remarks relates to. For overall ham radio questions relating to the big picture, national, division, state, or section concerns, the West Texas Section leadership team is available to assist you. Our cadre of Technical Specialists may also be of assistance to you in resolving operational or other technical issues. The West Texas Section has a webpage that provides a section-wide calendar, news and information and has links to club information as well. Go to: www.arrl-wtx.org

For local ham radio activities your local club will be your best point of contact. The club will have information related to local nets, meeting times and dates, club functions, etc. The local club may have a webpage that will provide information about the club and its role and function. Most clubs have members who are highly skilled in all things ham radio and they are available to help you along.

West Texas Section Points of Contact are:

Section Manager:

H. Dale Durham, W5WI
Buffalo Gap, TX
Email: w5wi@arrl.org
Cell: 830-719-9000

Section Emergency Coordinator:

J. David Overton, KF5WDJ
Midland, TX
Email: kf5wdj@att.net
Cell: 432-553-5597

Assistant Section Managers:

Kelly Briarton, KB2RN
El Paso, TX
Email: kb2rn@arrl.net
Cell: 719-246-8201

Tammy Harden, KB5NLP
Baird, TX
Email: kb5nlp@arrl.net
Cell: 325-665-3482

Ron Harden, Jr., WT5X
Baird, TX
Email: wt5x@wt5x.org
Cell: 325-513-3184

Billy D. Roberts, W5NPR
Alpine, TX
Email: w5npr@bigbend.net
Cell: 432-837-2741

Affiliated Club Coordinator and Webmaster:

Ron Harden, Jr., WT5X
Baird, TX
Email: wt5x@wt5x.org
Cell: 325-513-3184

Youth Coordinator:

Christopher Williamson, KD5SYI
Andrews, TX
Email: chris@texasaggie.us
Cell: 979-997-9544

West Texas Section Traffic Manager:

Russell (Rusty) Plocheck, WE5TXS
Abilene, TX
Email: we5txs@suddenlink.net
Cell: 325-518-0829

Technical Specialist:

W. Mel Saunders, AL7PB
Abilene, TX
Email: melsaun@att.net
Cell: 325-721-1212

Local Activities

Along with on the air nets, there are also local amateur radio related activities going on in the area. Your local club may have a webpage where pertinent information is posted along with contact information. You will find local repeater information here: http://www.txvhffm.org/repeaters/repeaters.php & you will find local clubs listed here: http://arrl-wtx.org/clubs/west-texas-section-clubs/

Operating Procedures and Etiquette

Manuals and study guides may help you obtain your license, but they don't really give you an idea of how you should act when you are on the air. They don't tell you what to do and what not to do. Use the following as helpful suggestions in making your first of many contacts.

Always listen before you transmit. Listen to other conversations to get an idea of what you need to say and abide by the ethics below:

- Be a good listener. It will help you better organize your thoughts before transmitting.
- Exercise politeness regardless of the circumstances. Whenever you begin to feel that you can't, then stop transmitting.
- Speak clearly and slowly, especially when giving your call sign to someone you have not worked before.
- Make it clear at the end of every transmission which station is expected to transmit next whenever there are more than two stations in the conversation.
- Pause between transmissions. "Quick keying" gives the appearance that other hams are unwelcome in your QSO.
- Develop good operating practices. You will be doing your part in helping to insure the continuance of our long and proud tradition of self-regulation. Moreover, you might just convince someone else to become a ham.

How to Make a QSO

A QSO is a contact by radio between two or more hams. You can make a general call (CQ), you can answer someone's CQ or call someone who has just finished a contact with another station. Always listen before transmitting. Don't break into a contact unless you have something significant to add or if you have an emergency.

If you want to talk via the repeater while it is already in use, wait for a pause between transmissions to announce your call. First give the call of the person you are speaking to followed by your own call. Use the term "Break, Break" followed by your call sign, if you have emergency traffic. If you'd like to join an ongoing QSO give your callsign during their "over" (when they go to the other operator or next person) or when asked by the net control station.

When your contact switches the transmission over to you, it is a good habit to wait a second before starting your transmission.

How Do You Call CQ on HF?

Start listening for a while on the band or frequency you intend to use. If the frequency seems to be clear to you, ask if it is in use by stating:

Is this frequency in use?
Pause (minimum of five seconds)
Is this frequency in use? This is (your call sign)
Pause
Is this frequency in use? This is (your call sign)
Pause

And if still no one replies then call CQ by stating:

CQ, CQ, CQ calling CQ. This is (your call sign) calling CQ.
(your call sign using ITU phonetic alphabet).
(your call sign) in (your city) calling CQ.
This is (your call sign) calling CQ.
(your call sign using ITU phonetic alphabet).
(your call sign) in (your city) calling CQ and standing by.

When answering a CQ:
Hello (His/Her call) this is (your call)
You are (signal report) here into (your city and state).
My name is _____. (your call sign using ITU phonetic alphabet).
Over

When ending a CQ:
Thank you (His/Her call)
It was nice to meet you.
Seven three.
(your call sign)

Weblinks & Books

Interesting & Useful Ham Radio Links:

The American Radio Relay League (ARRL): www.arrl.org
Space Weather: https://www.spaceweather.com
Space Weather Tutorial: www.spaceacademy.net.au/env/spwx/spwxtute.htm
Internet Radio Linking Project (IRLP): www.irlp.net
Echolink: http://www.echolink.org
Equipment reviews and much more: https://www.eham.net
Skywarn - classes and weather activations: www.skywarn.org
Large resource for ham radio: www.k0bg.com
Look up call signs and more: https://www.qrz.com
Ham Radio Blog & Study Help: https://www.kb6nu.com
Ham Radio Crash Course: https://hrcc.stream
Ham Radio Concepts: https://www.hamradioconcepts.com
David Casler: http://dcasler.com
E-Ham: https://www.eham.net
On the Air Podcast: http://www.arrl.org/on-the-air-podcast
D-STAR: http://www.dstarinfo.com/home.aspx
CW Academy: https://cwops.org/cw-academy/
ARRL West Texas Section: http://www.arrl-wtx.org

Ham Radio Stores:

Ham Radio Outlet: www.hamradio.com
Gigaparts: www.gigaparts.com
DX Engineering: www.dxengineering.com
MTC: https://www.mtcradio.com

Reference Books:

ARRL Handbook 2020 (Softcover)
ARRL Operating Manual
ARRL Repeater Directory 2020 Edition
Amateur Radio Contesting for Beginners
ARRL Antenna Book (Softcover)
Nifty E-Z Guide to EchoLink Operation
Nifty E-Z Guide to D-STAR Operation
Nifty E-Z Guide to PSK31 Operation
FCC Rules and Regulations
Portable Operating for Amateur Radio
ARRL General Class License Manual 9th Edition (Spiral Bound)
ARRL Extra Class License Manual 12th Edition (Spiral Bound)

Typical Commands

The two letter codes listed below are typically used with Morse Code (CW) while the other commands are used with Voice modes.

Voice	Code	Situation
Go ahead	K	Used after calling CQ, or at the end of a transmission, to indicate any station is invited to transmit.
Over	AR	Used after a call to a specific station, before the contact has been established.
	KN	Used at the end of any transmission when only the specific station contacted is invited to answer.
Stand by or wait	AS	A temporary interruption of the contact.
Roger	R	Indicates a transmission has been received correctly and in full.
Clear	SK	End of contact. SK is sent before the final identification.
Leaving the air or closing the station	CL	Indicates that a station is going off the air, and will not listen or answer any further calls. CL is sent after the final identification.

Morse Code Alphabet & Numbers

International Morse Code

1. The length of a dot is one unit.
2. A dash is three units.
3. The space between parts of the same letter is one unit.
4. The space between letters is three units.
5. The space between words is seven units.

A ● ▬
B ▬ ● ● ●
C ▬ ● ▬ ●
D ▬ ● ●
E ●
F ● ● ▬ ●
G ▬ ▬ ●
H ● ● ● ●
I ● ●
J ● ▬ ▬ ▬
K ▬ ● ▬
L ● ▬ ● ●
M ▬ ▬
N ▬ ●
O ▬ ▬ ▬
P ● ▬ ▬ ●
Q ▬ ▬ ● ▬
R ● ▬ ●
S ● ● ●
T ▬

U ● ● ▬
V ● ● ● ▬
W ● ▬ ▬
X ▬ ● ● ▬
Y ▬ ● ▬ ▬
Z ▬ ▬ ● ●

1 ● ▬ ▬ ▬ ▬
2 ● ● ▬ ▬ ▬
3 ● ● ● ▬ ▬
4 ● ● ● ● ▬
5 ● ● ● ● ●
6 ▬ ● ● ● ●
7 ▬ ▬ ● ● ●
8 ▬ ▬ ▬ ● ●
9 ▬ ▬ ▬ ▬ ●
0 ▬ ▬ ▬ ▬ ▬

ITU Phonetic Alphabet

While not normally used in casual conversation on VHF/UHF in an emergency situation or on a net it is desirable to use the phonetic alphabet when giving your callsign or providing critical information. As an example, "Hello, this is Whiskey One November Yankee" would be more understandable than "Hello, this is W 1 N Y" in some situations. You might hear different phonetics as operators will make up their own, but it's suggested to use the ITU/NATO phonetic set during formal nets and emergency related communications to keep uniformity.

A – Alpha	J – Juliet	S – Sierra
B – Bravo	K – Kilo	T – Tango
C – Charlie	L – Lima	U – Uniform
D – Delta	M – Mike	V – Victor
E – Echo	N – November	W – Whiskey
F – Foxtrot	O – Oscar	X – X-Ray
G – Golf	P – Papa	Y – Yankee
H – Hotel	Q – Quebec	Z – Zulu
I – India	R – Romeo	

The International Telecommunications Union
Standard Phonetic Alphabet

RST System & RSQ System for HF

Most often during simplex communications operators will exchange a report with each other so operators will have an understanding in how their signals are. Operators use what is known as the RST Code. RST stands for Readability, Strength and Tone. Operators will use a numbering system to inform the other operator how strong and clear their signal may or may not be. The T in RST is used in CW (Morse code) communication where phone communications use just RS.

 If you hear someone say "you're 5-9" while on SSB, that means you have a perfectly readable signal that is strong.

When communication occurs on HF Bands typically the RSQ system is used. The Q in RSQ stands for Quality and is used to indicate the presence of additional unwanted trace modulation observed on the waterfall or spectrum indicates possible spurious emissions and provides a basis for assessing the quality of digital mode signals.

- **Readability**
1--Unreadable
2--Barely readable, occasional words distinguishable.
3--Readable with considerable difficulty.
4--Readable with practically no difficulty.
5--Perfectly readable.

- **Signal Strength**
1--Faint signals, barely perceptible.
2--Very weak signals.
3--Weak signals.
4--Fair signals.
5--Fairly good signals.
6--Good signals.
7--Moderately strong signals.
8--Strong signals.
9--Extremely strong signals.

- **Tone**
1--Sixty cycle a.c or less, very rough and broad.
2--Very rough a.c., very harsh and broad.
3--Rough a.c. tone, rectified but not filtered.
4--Rough note, some trace of filtering.
5--Filtered rectified a.c. but strongly ripple-modulated.
6--Filtered tone, definite trace of ripple modulation.
7--Near pure tone, trace of ripple modulation.
8--Near perfect tone, slight trace of modulation.
9--Perfect tone, no trace of ripple or modulation of any kind.

READABILITY

R5	95%+	Perfectly readable
R4	80%	Practically no difficulty; occasional missed characters
R3	40%	Considerable words distinguishable
R2	20%	Occasional words distinguishable
R1	0%	Undecipherable

STRENGTH

S9	**Very Strong** trace
S7	**Strong** trace
S5	**Moderate** trace
S3	**Weak** trace
S1	**Barely Perceptible** trace

QUALITY

|	
Q9	Clean Signal - no visible unwanted sidebar pairs
Q7	**One barely visible** pair
Q5	**One easily visible** pair
Q3	**Multiple visible** pairs
Q1	**Splatter** over much of the spectrum

Q - Codes

Q-codes are abbreviated meanings mainly used in Morse code (CW) communication. CW operators often use abbreviations and cut words to shorten the amount of characters one must send. It's also beneficial during difficult to understand communications. Some of Q-Codes have carried over to both digital and voice communications. Here is a list of all the common Q-Codes.

| Signal	Question/Answer	Signal	Question/Answer
QRG	Will you indicate my exact frequency?	QSA	What is the signal strength of my signal?
QRH	Does my frequency vary?	QSB	Does the strength of signals vary?
QRI	How is the tone of my frequency?	QSD	Is my keying correct? Are my signals distinct?
QRJ	Are you receiving my badly?	QSG	Must I transmit… telegram(s) at a time?
QRK	What is the legibility of my signals (1-5)?	QSK	Shall I continue the transmission of all my traffic?
QRL	Are you busy?	**QSL**	Can you acknowledge receipt?
QRM	Is there interference?	QSM	Shall I repeat the last telegram I sent you?
QRN	Are you troubled by static?	**QSO**	Can you communicate with directly?
QRO	Must I increase power?	QSP	Will you reply to…..?
QRP	Must I decrease power?	QSV	Shall I send a series of VVV…?
QRQ	Must I send faster?	QSX	Will you listen for (call sign) on (frequency)?
QRS	Must I send slowly?	**QSY**	Shall I change frequency?
QRT	Must I stop transmission?	QSZ	Shall I send each word or group twice?
QRU	Have you anything for me?	QTA	Shall I cancel nr… as if it had not been sent?
QRV	Are you ready?	QTB	Do you agree with my word count?
QRW	Must I advise, that you are calling?	QTC	How many telegrams have you to send?
QRX	When will you call again?	**QTH**	What is your position (location)?
QRZ	By whom am I being called?	QTR	What is the exact time?

US Band Plan

The band plan is essentially a gentlemen's agreement within the FCC allotted bands that determines what frequencies you may transmit on (and what operating modes you may use) depending on the class of your license. Other important information such as potential power limitations is also included in appropriate places.
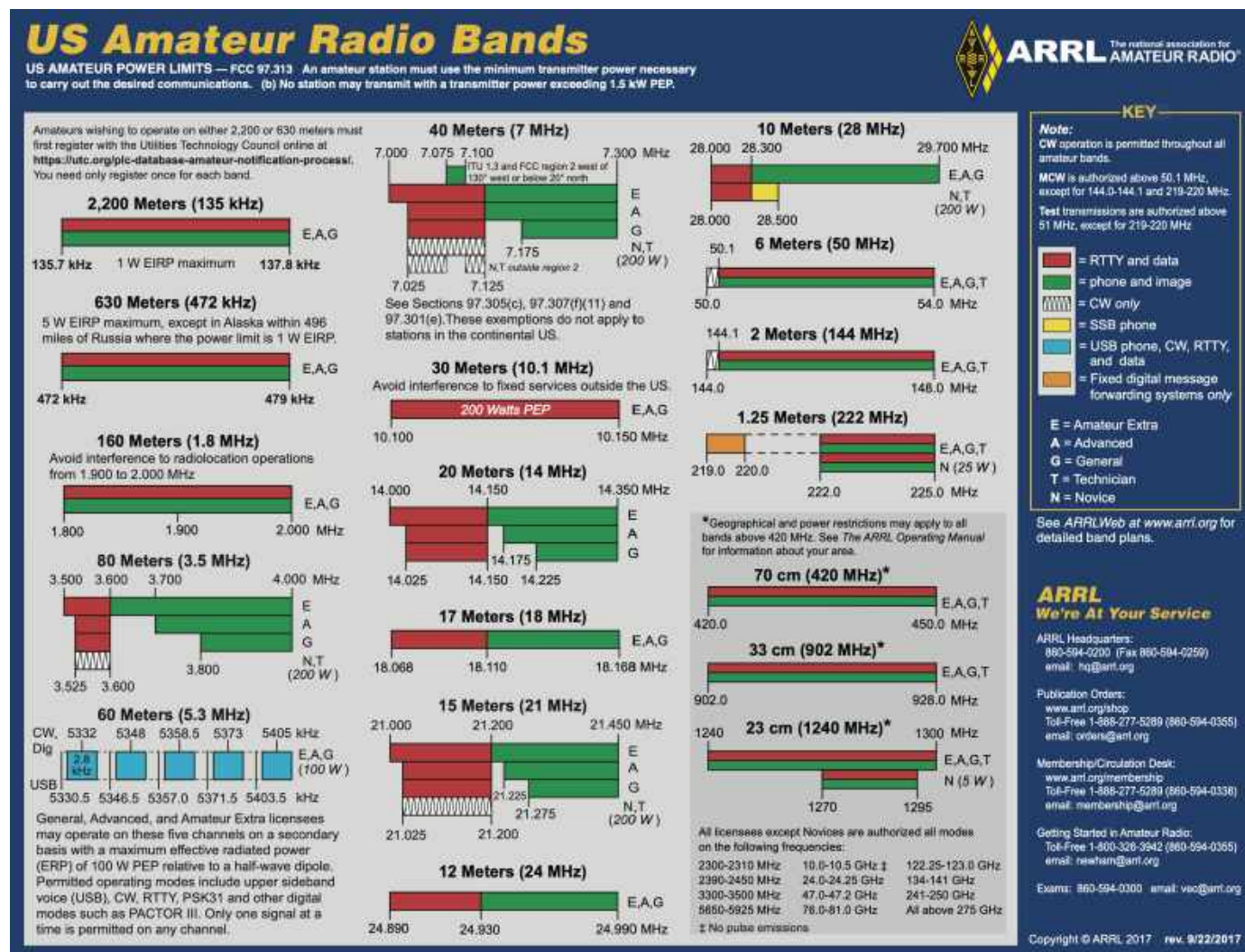
Worked All States (WAS) Map

The WAS is ARRL's most popular award. It is available to all amateurs worldwide who submit proof with written confirmation of contacts with each of the 50 states of the United States of America. Amateurs in the U.S. and possessions must be members. Any or all bands may be used (with the exception of 60 Meters). Contacts must be made from same location, or from locations no two of which are more than 50 miles apart. Contacts must be confirmed in writing, preferably in the form of QSL cards, or via Logbook of the World (LoTW). Contacts made through repeaters or any other power relay method cannot be used for WAS credit. A WAS award is available for Satellite contacts. All stations contacted must be "land-based stations."
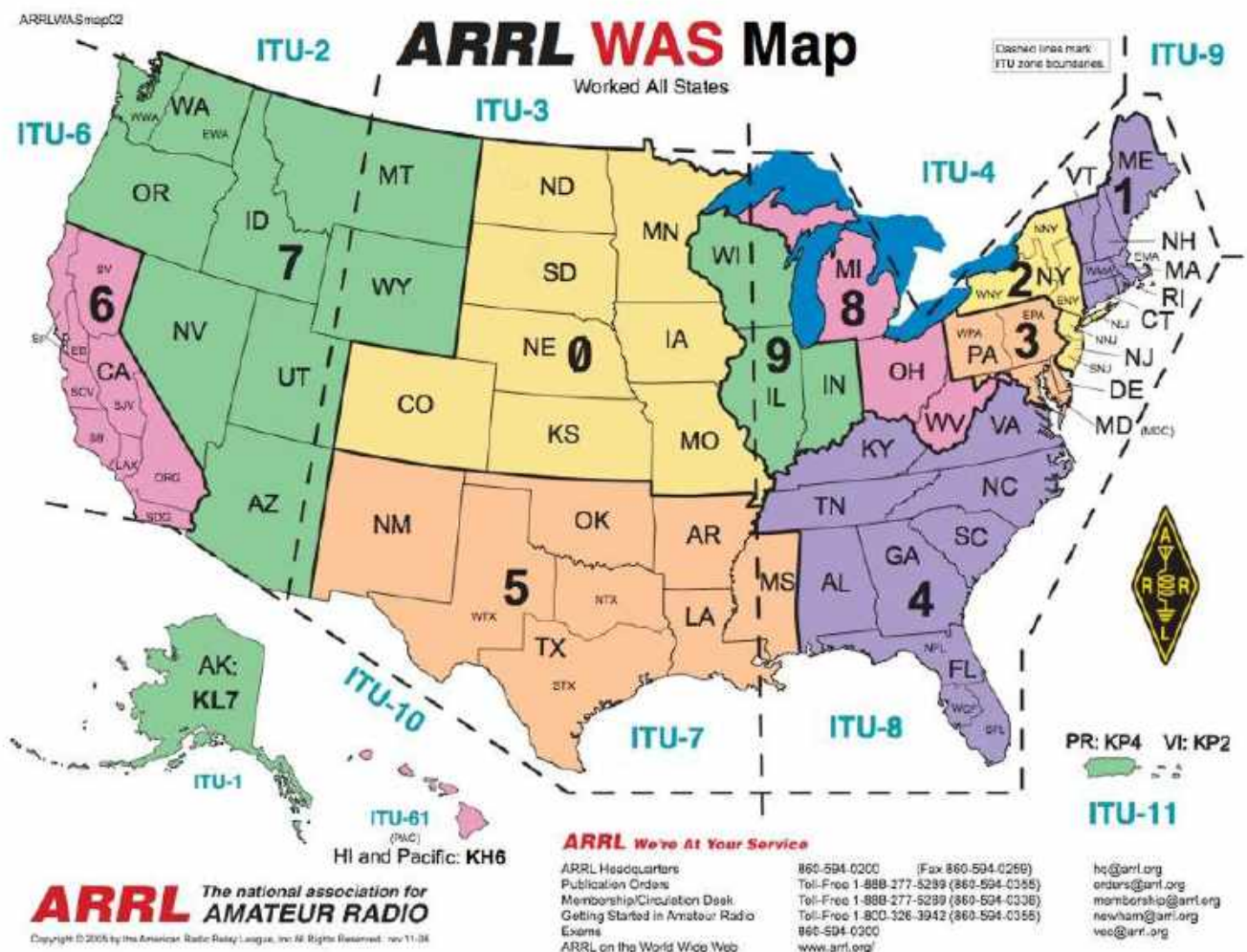

ITU Zones stands for International Telecommunication Union. Among other responsibilities, they divide the world into zones and basically allocate frequencies based on which zone you are in.

Grid Square Map

The Maidenhead Grid Locator system (also called grid square) is a geographic coordinated system used by amateur radio operators to succinctly describe their location. The system can describe any location in the world. Latitudes and longitude can be converted to and from the grid. Many hams need to know your exact location for logging and awards purposes. Find your grid square here https://www.levinecentral.com/ham/grid_square.php
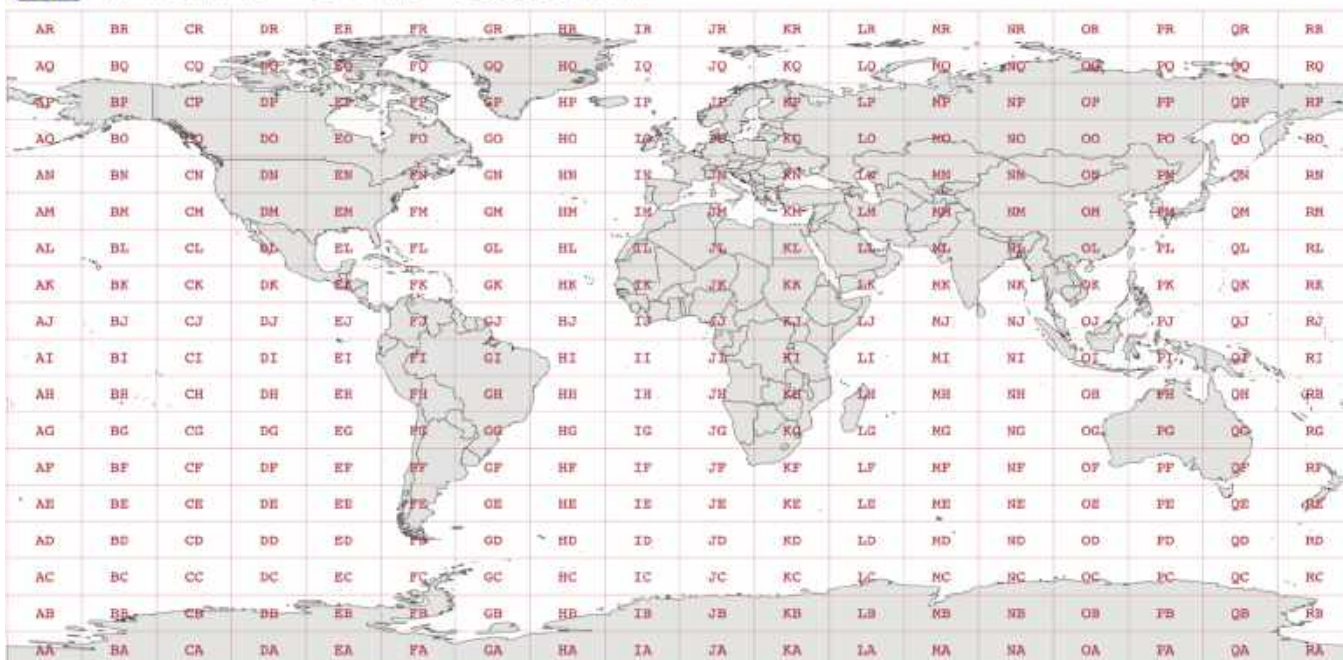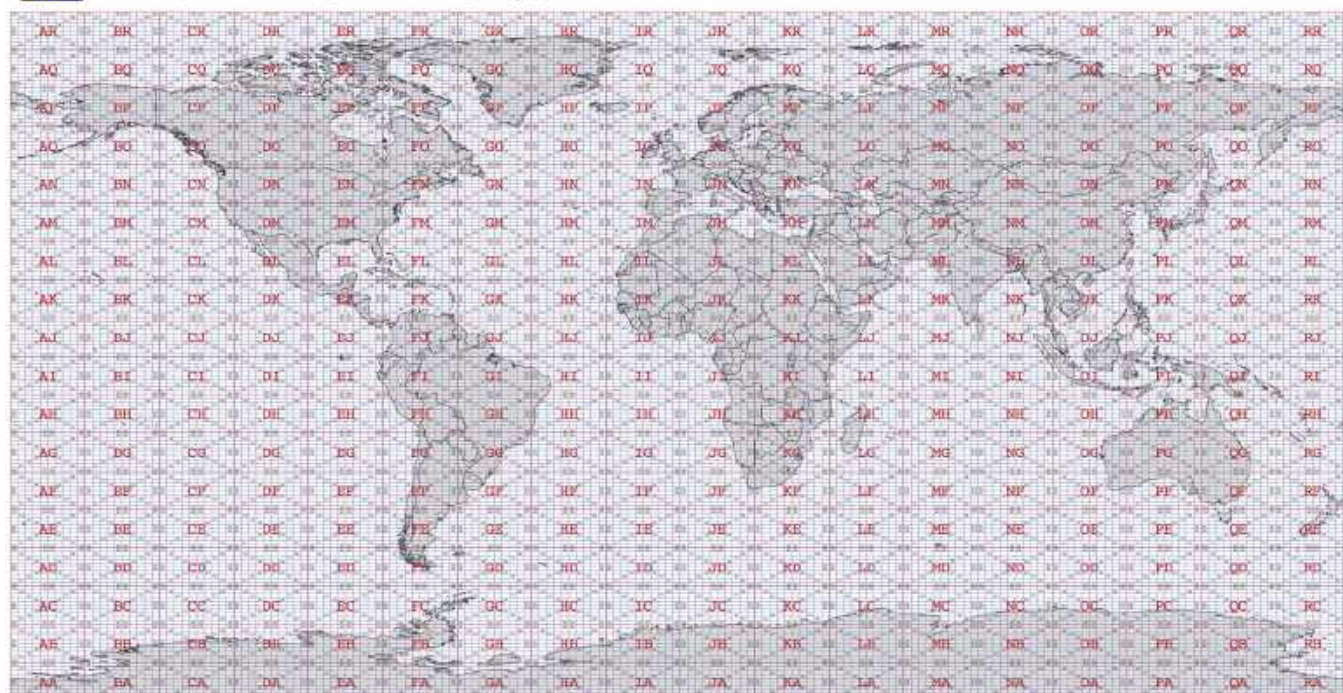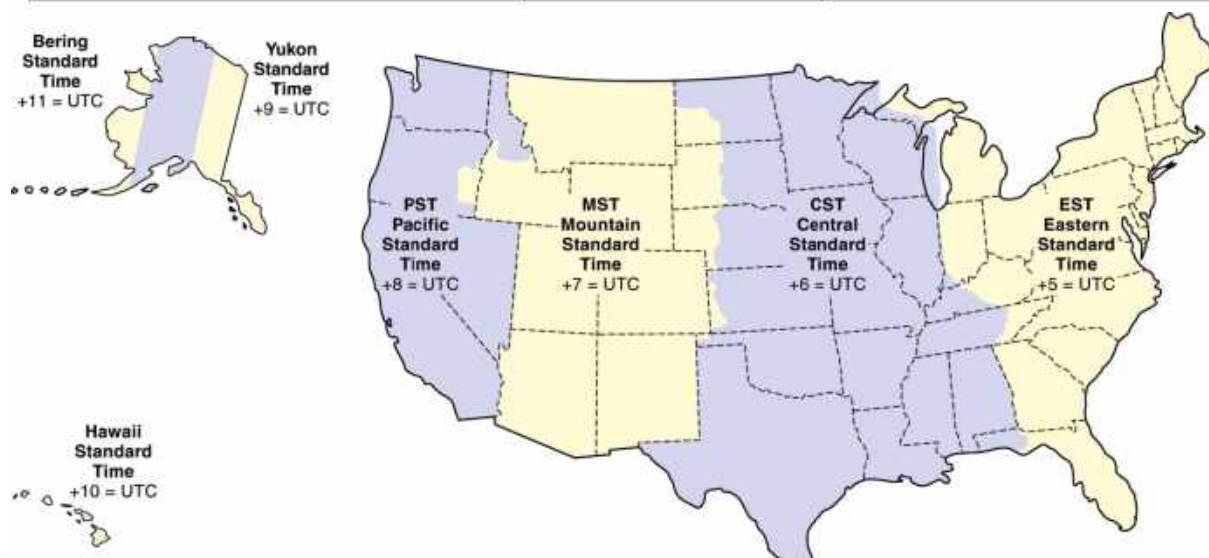
Logging Contacts

When it comes to making contacts on the air, most often operators will log their contacts into a logbook. Since it's possible to make contacts around the world in different time zones, amateur radio operators will use Coordinated Universal Time (UTC) while logging. Often called Z time or Zulu, this allows easy confirmation (QSL) of contacts worldwide. Most often operators will also use the 24hr format. For example, 6 pm in Massachusetts would be 18:00 EST local which would be 23:00 UTC   Use the chart below as reference.

To Change UTC Time to Local Time	Time Zone	To Change Local Time to UTC Time
Subtract 4 hours	Eastern Daylight	Add 4 hours
Subtract 5 hours	Eastern Standard	Add 5 hours
Subtract 5 hours	Central Daylight	Add 5 hours
Subtract 6 hours	Central Standard	Add 6 hours
Subtract 6 hours	Mountain Daylight	Add 6 hours
Subtract 7 hours	Mountain Standard	Add 7 hours
Subtract 7 hours	Pacific Daylight	Add 7 hours
Subtract 8 hours	Pacific Standard	Add 8 hours
Subtract 9 hours	Yukon Standard	Add 9 hours
Subtract 10 hours	Alaska, Hawaii Standard	Add 10 hours
Subtract 11 hours	Bering Standard	Add 11 hours

Bering Standard Time +11 = UTC

Yukon Standard Time +9 = UTC

Hawaii Standard Time +10 = UTC

PST Pacific Standard Time +8 = UTC

MST Mountain Standard Time +7 = UTC

CST Central Standard Time +6 = UTC

EST Eastern Standard Time +5 = UTC

Amateur Radio Logbook

The FCC no longer requires operators to log their contacts but it's still common practice that many operators still do in many cases. Logs are used by operators to confirm that a contact did indeed take place.

On HF (3-30Mhz) communications, it's common for operators to exchange postcards (called QSL cards) with contact details that could be used for certain awards like DXCC and WAS. If there is a computer nearby, there are many software packages that allow you to use your computer to log to contacts and some will even track your progress.

Your local resources should be able to guide you to the setup and use of logging software. Most logging software has very excellent support online and by email. Just like a car, video game, each one has their preference as to what they like. Check them out to see which one is best for you. Here is an example of a typical paper logbook page if you prefer to log with paper & pen.

Amateur Radio Logbook – Callsign:_____

Date:_____   Location:_____   Page number:_____

Time	Callsign	Band	Mode	Power	Signal Out	Signal In	Name	Location / Notes

www.m0ukd.com

Logging software

ARRL LoTW https://lotw.arrl.org/lotwuser/default

LoTW is a repository of log records and is one of the most popular logging utilities used worldwide. It enables you to electronically submit contacts (QSOs) for confirmation, view your submitted QSOs and resulting confirmations online, view your DXCC, VUCC, WAS, WAZ and WPX award progress online & electronically submit confirmations for credit toward DXCC, VUCC, WAS, WAZ and WPX awards. Using your preferred logging software, you upload your contacts to LOTW. This has been a faster method for contact confirmation which has been slowly replacing QSL cards.
Cost: Free, Platform: Windows, Mac, Linux

N1MM Logging https://n1mmwp.hamdocs.com/
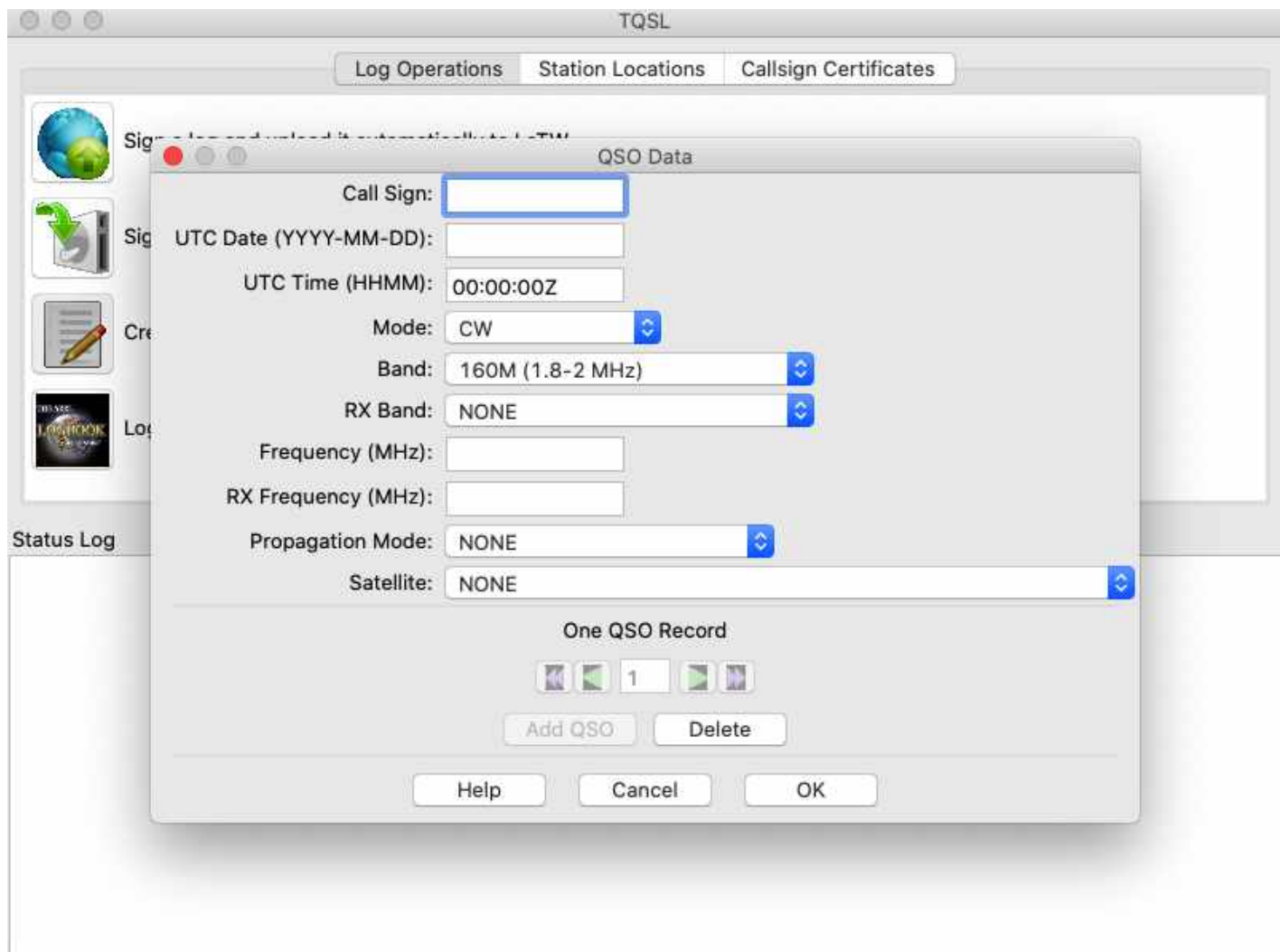
N1MM is one of the more popular pieces of logging software, it supports most contests and a large number of radios.
Cost: Free, Platform: Windows

Ham Radio Deluxe https://www.hamradiodeluxe.com/
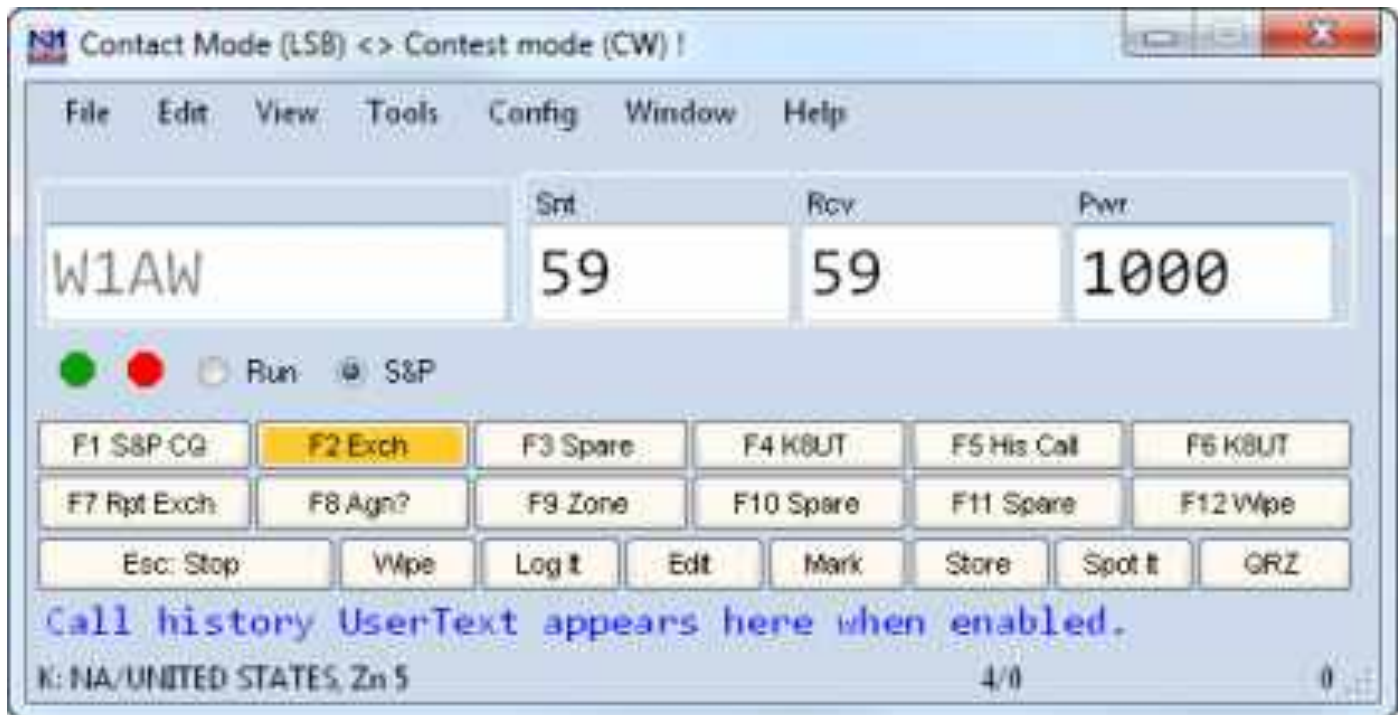
HRD has a free version but is a subscription service. It is a highly versatile digital operating program with an excellent logbook feature. One of the older software products, it combines logging and most digital modes with the exception of FT-8. Platform: Windows

FLLog http://www.w1hkj.com/
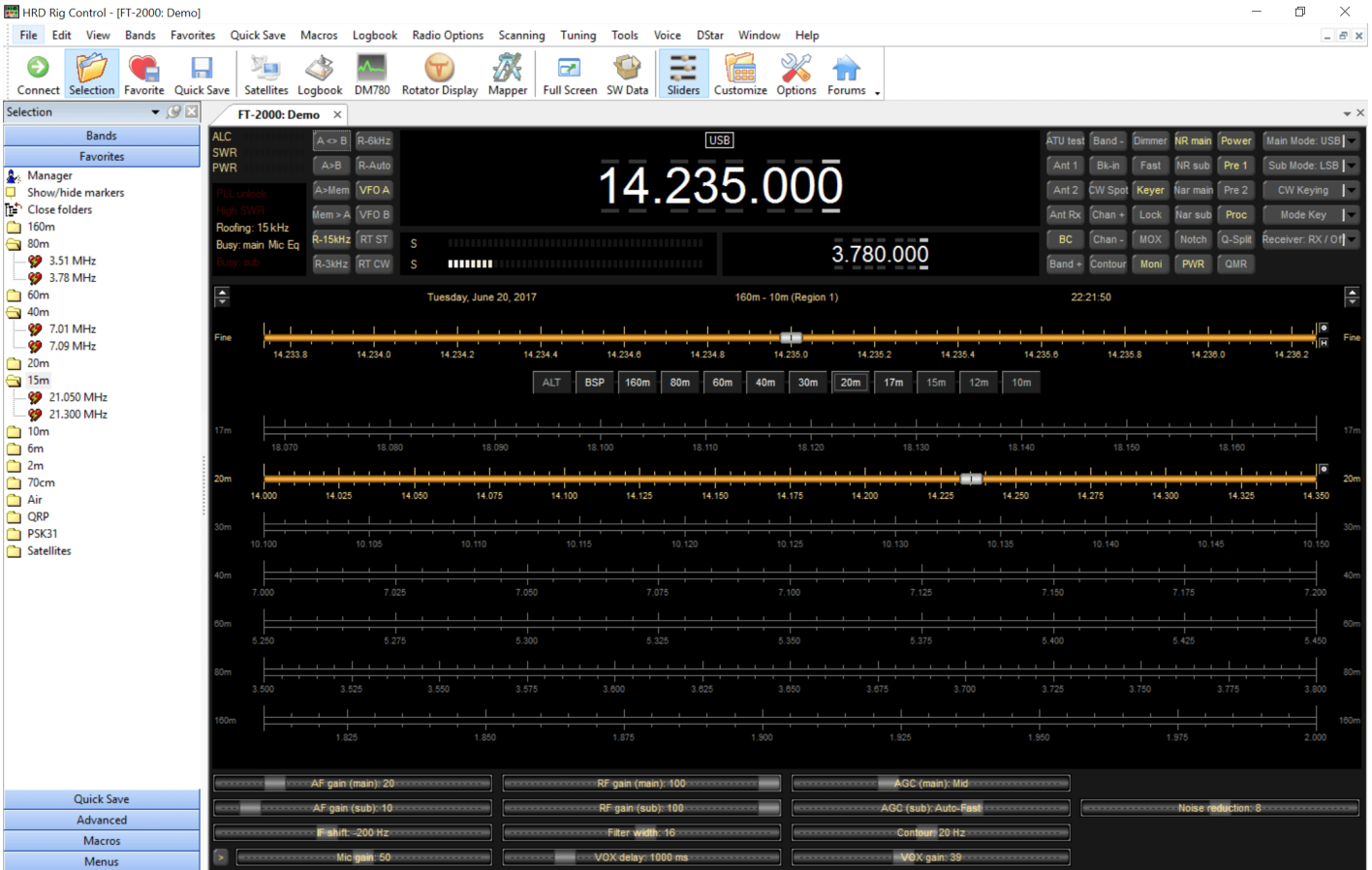
FLLog is part of the popular open source platform called fldigi. It is rather no-frills and functions just to allow you to keep track of contacts, it does not make maps or keep track of points for contacts. Cost: Free, Platform: Windows, Mac, Linux, even raspberry pi.

Log4OM https://www.log4om.com/

Log4OM is a flexible and easy to use and runs even on quite old windows hardware.
Cost: Free, Platform: Windows
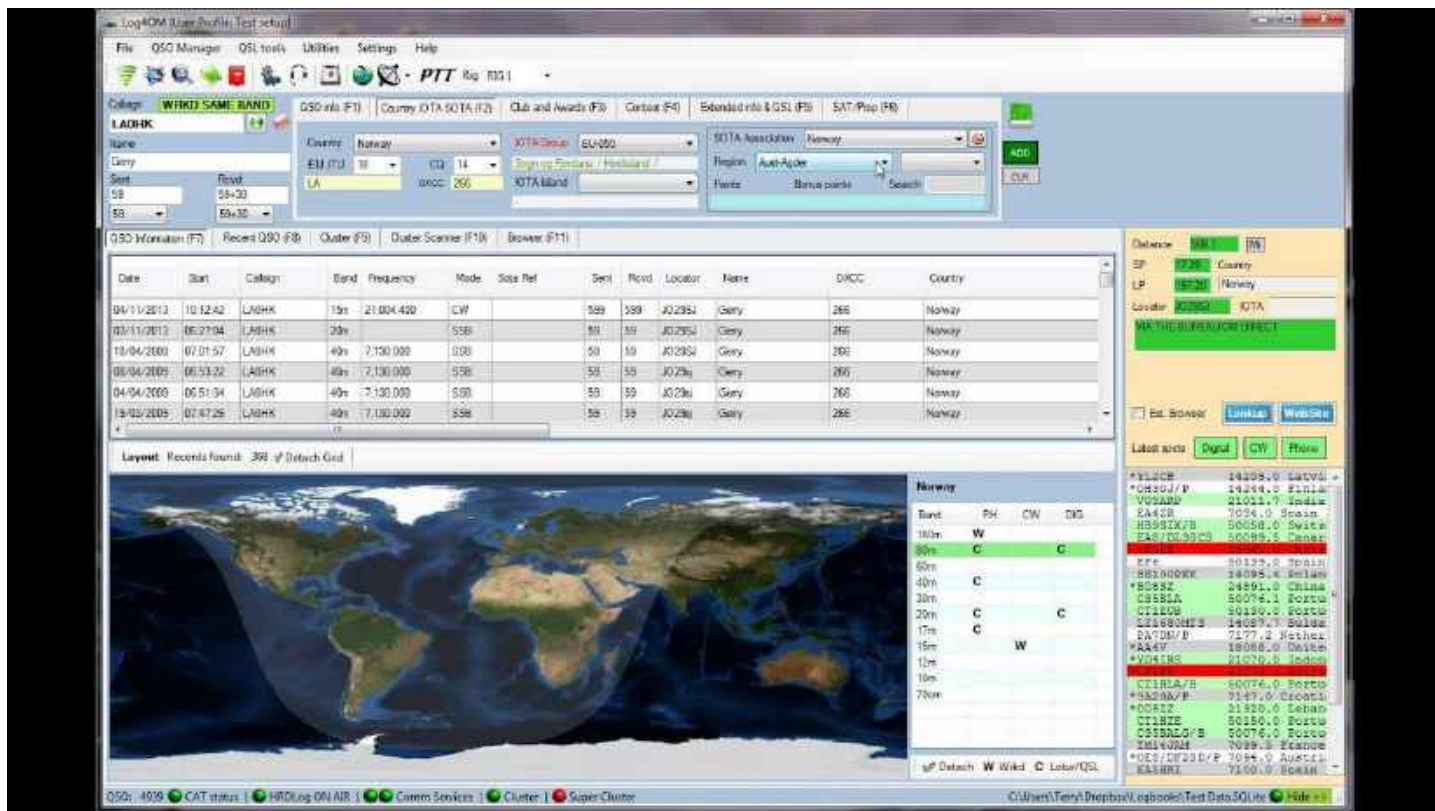
Contesting Software http://www.n3fjp.com/

The author makes different program for different contests, the software is very popular with some contests.
Cost: Depends on the exact program. Platform: Windows

Software for Digital Modes

Both Ham Radio Deluxe and Fldigi (FlLog above) are popular platforms for operating digital, the various digital modes allow files, emails, text and other data to be sent via your ham radio.

Other software includes:
WSJT-X: https://physics.princeton.edu/pulsar/k1jt/wsjtx.html

JS8Call: http://js8call.com/

These two software packages are for weak signal/low power communication and do not allow for very fast information exchange but do allow for data to be sent even under the worst conditions.

Emergency Communication Organizations

ARRL Amateur Radio Emergency Service (ARES)—ARES consists of licensed amateurs who have voluntarily registered their qualifications and equipment, with their local ARES leadership, for communications duty in the public service when disaster strikes. Each ARRL Section has a Section Emergency Coordinator (SEC), District Emergency Coordinators (DEC) and the local County or sometimes smaller unit designation Emergency Coordinators (EC). Here in West Texas we have a SEC, Six DEC's and 89 EC's.

Other EmComm groups in Texas is the Texas State sponsored Radio Amateur Civil Emergency Service (RACES), local Community Emergency Response Teams (CERT), Radio Emergency Associated Communication Teams (REACT) and others. The most active services are ARES and RACES.

ARRL National Traffic System (NTS) During disasters or other emergencies, Traffic nets communicate information worldwide that is critical to saving lives or property, or to inquire about the health or welfare of a disaster victim. Both the NTS and RRI work together to ensure the timely delivery of communicated information.

Radio Relay International (RRI) is also an organization that operates traffic nets that communicate information worldwide that is critical to saving lives or property, or to inquire about the health or welfare of a disaster victim. Both the NTS and RRI work together to ensure the timely delivery of communicated information.

Digital Modes for Emergency Communications

WINLINK specifically allows for the sending of email with your HF or VHF/UHF radio. WinLink Express is a program that allows transmission of email messages to a remote email user when the internet is down. This is accomplished by sending the message by radio to one of the hundreds of remote servers that are setup specifically to handle this traffic. This allows email use when a whole state or greater area has been compromised by weather or other situations … you simply choose to connect to any Gateway station that is outside the affected area. The WinLink software assists in identifying the strongest potential station for you to use and enlists current atmospheric conditions to help determine this. Winlink http://www.winlink.org

APRS Automatic Packet Reporting System is an amateur radio-based system for real time digital communications of information of immediate value in the local area. Data can include object Global Positioning System (GPS) coordinates, weather station telemetry, text messages, announcements, queries, and other telemetry. http://www.aprs.org

IN CLOSING …

This guide is just a basic overview. Amateur radio offers an enormous diversity to suit your radio interests. We could not even start to include everything in this guide. The good news is there is a vast wealth of information online and in publication form which will concentrate on what you are interested in … emergency communications, contesting, Morse code, satellites, balloons etc.

The best way to learn more about Amateur Radio is:
- Join the ARRL which has many additional resources and a store where you can purchase books to learn more.
- Find and join a local amateur radio club and utilize the technical resources there.

Another avenue for assistance is groups that host "hamfests" or regional ARRL conventions where there are forums you can attend and vendors you can visit.

As you can see, it is endless. We are here to assist you in your journey in radio… have fun and get on the air!

Thank you … and 73