

## **CW, the coolest mode. AK0Z – Larry**

Morse code is pronounced More-s code not Morris code. It is made up of dots(dits) and dashes(dahs).

For the history and other information, go to [www.wikipedia.org](http://www.wikipedia.org) and search Morse code.

International Morse code includes the letters a through z and numbers 0 through 9 and some punctuation characters. There is no distinction between upper and lower case letters. Each Morse code symbol is formed by a sequence of dits and dahs. The dit duration is the basic unit of time measurement in a Morse code transmission. The duration of a dah is three times the duration of a dit. Each dit or dah within an encoded character is followed by a period of signal absence, called a space, equal to the dit duration. The letters of a word are separated by a space of duration equal to three dits, and words are separated by a space equal to seven dits. One of the most important aspect of sending good code is the seven dit space between words. Learn the spacing while practicing, it is very important for sending good code.

CW stands for continuous wave. There are no side-bands with a pure CW signal, so nothing is heard when receiving the signal. If you have an AM receiver all you will hear is maybe a thud. A BFO or beat frequency oscillator generates a sidetone which is beat to the received signal so that an audible sound can be heard.

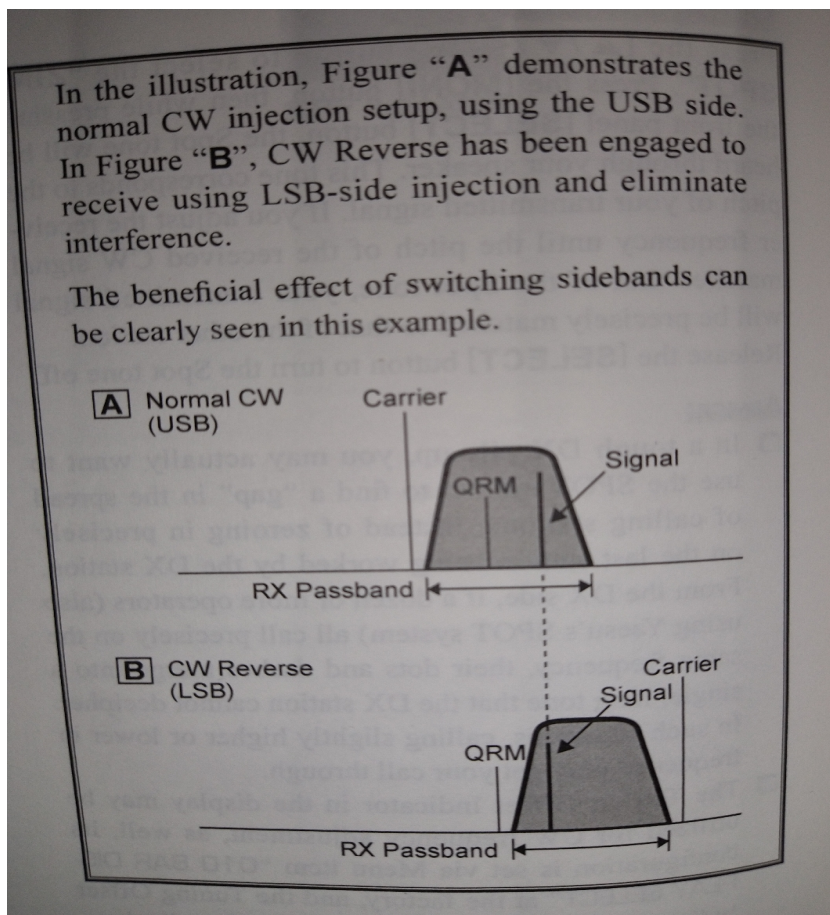
Many older radios have a spot button. While close to the receiving cw signal hold the spot button, this will make your sidetone audible and tune your radio to hear a tone equal to your sidetone. This will put you on the receiving frequency. Modern radios you have a choice of sidetones that that you can select that suits you best, usually 600 or 700 Hz.

In a tough DX pileup, you may actually want to use the Spot system to find a gap in the spread of the calling stations, instead of zeroing in precisely on the last

station being worked by the DX station. From the DX side, if many operators all call precisely on the same frequency, their dots and dashes merge into a single, long tone that the DX station can not decipher. In such situations, calling slightly higher or lower in frequency may get your call through.

Most modern radios have a spot and/or Zin button. While close to the receive frequency press the Zin button and your receiver will automatically tune to the correct tone or the correct receive frequency. In many cases you will have a slide indicator showing you when you are on frequency.

Some radios might have a CW mode button and that is all. Most modern radios have a normal and reverse mode for CW. Normal mode is USB CW and LSB CW or reverse mode. You will normally use USB CW, but you can switch to LSB CW if you have an interfering signal. This might take the interfering signal out of your passband.



There is four types of keys. Straight key, semi automatic or(bug), single paddle or(cootie, side swiper)and dual paddles. The straight key can be plugged into the radio and used as an on, off switch to generate the dits and dahs. The bug can automatically make the dits. Be careful, if you have a built in keyer you may have to use stereo plugs on all of your keys or you will have a key down situation, and the ring is not used. To be safe, use all stereo plugs even with a two wire straight key. The paddles need an electronic keyer to work. The left paddle may generate the dits and the right the dahs. This can be reversed by switching the wires on the key or in the menu on the radio.

Send QRS, to have the other operator to slow down. Also when answering a call do so at the other person's speed.

The experts say to start out using a straight key. Some say to do head copy only when starting that is don't write down what you hear.

Newer radios have the capability to store key characters in memory. This can be handy when just sending CQ, which could be made up of CQ, CQ, CQ, de(from), and your call sign, and (dah dit dah) for over. That way you just hit a memory key and it is automatically sent to repeat the sequence. This is very handy when calling in a contest. When you hear dah, dit, dit dit dit, dah, (test) which is short for contest, you can proceed accordingly. Setting this up is different with each radio but is straightforward. You can either record by using your key or using the built in keyboard or scroll through lettering on the radio. The best way to join in a contest is to subscribe to the ARRL newsletter. This is a periodic email the gives the dates and names of contest. Clicking on them will take you to the rules of the contest including the exchange needed. The exchange could be a signal report and state initials or a serial number and state. You should know the exchange before answering someone calling "test". Set AGC to fast. Bandpass at 3kHz and narrow as needed. Keyer on for paddles and off for straight key. Have monitor on and brk-in off to listen to your sidetone. This allows you to monitor without transmitting.

More than one key can be hooked up to your radio at the same time by using a “Y” cable. In my case, I have ¼” stereo jack on my radio for a key. My paddle and straight key have 1/8” stereo plugs. The ring is not connected on the straight key. My “Y” cable is ¼” stereo plug to two 1/8” stereo jacks. Be sure you use a stereo plug on your straight key or you will have a key down situation, and the ring is not used. You can purchase the right combination for you keys from Amazon. If more keys are needed just add more “Y” cables inline. No more plugging and unplugging keys. Just use the keyer on and off for the different keys and brk-in on and off to transmit or practice sending.

I learned code with an Android app called IZ2UUF Morse Koch CW. This is a free app, for learning up to about 20wpm and then a fee for practicing head copy. There are many other ones that are also good and also for iOS.

[Www.LCWO.net](http://www.LCWO.net) (learn CW online) is a good site for learning CW in your browser.

Straight Key Century Club

around 7.050.0MHz, 14.050.0MHz 21.050.0MHz

[www.skccgroup.com](http://www.skccgroup.com) join and receive a skcc number. Free and a wealth of info.

[SKCC@groups.io](mailto:SKCC@groups.io) is a good place to get answers to questions.

The Straight Key Century Club is the largest association of straight key Morse code CW operators and enthusiasts in the world. My number is 24301.

FISTS

[www.fistsna.com](http://www.fistsna.com) Join and receive a Fists number. Free and a wealth of info.

[fistsamericas@groups.io](mailto:fistsamericas@groups.io) a place to get questions answered. My number is 21137.

I monitor 147.150 repeater if you have questions about CW.

HF CW practice.

Wednesdays, @ 7pm on 10meters, 28.125 MHz. There will be real slow code practice for beginners. Call me on repeater 147.150, if you want to practice sending and receiving.

## The RST System

### International Morse Code

- 1 dash = 3 dots.
- The space between parts of the same letter = 1 dot.
- The space between letters = 3 dots.
- The space between words = 7 dots.

A	• —	V	• • • —
B	— • • •	W	• — —
C	— • — •	X	— • • —
D	— • •	Y	— • — —
E	•	Z	— — • •
F	• • — •	.	• • • • • •
G	— • — •	,	— — • • — —
H	• • • •	?	• • — — • •
I	• •	/	— • • — •
J	• — — —	@	• — — • • —
K	— • —	1	• — — —
L	• — • •	2	• • — — —
M	— —	3	• • • — —
N	— •	4	• • • • —
O	— — —	5	• • • • •
P	• — — •	6	— • • • •
Q	— — • —	7	— — • • •
R	• — •	8	— — — • •
S	• • •	9	— — — — •
T	—	0	— — — — —
U	• • —		

### 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 AC or less, very rough and broad.
- 2 - Very rough AC, very harsh and broad.
- 3 - Rough AC tone, rectified but not filtered.
- 4 - Rough note, some trace of filtering.
- 5 - Filtered rectified AC. 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.

If the signal has the characteristic steadiness of crystal control, add the letter X to the RST report. If there is a chirp, the letter C may be added to so indicate. Similarly for a click, add K. The above reporting system is used on both cw and voice, leaving out the "tone" report on voice.

State	CODE
Alabama	AL
Alaska	AK
Arizona	AZ
Arkansas	AR
California	CA
Colorado	CO
Connecticut	CT
Delaware	DE
Florida	FL
Georgia	GA
Hawaii	HI
Idaho	ID
Illinois	IL
Indiana	IN
Iowa	IA
Kansas	KS
Kentucky	KY

State	CODE
Louisiana	LA
Maine	ME
Maryland	MD
Massachusetts	MA
Michigan	MI
Minnesota	MN
Mississippi	MS
Montana	MT
Nebraska	NE
Nevada	NV
New Hampshire	NH
New Jersey	NJ
New Mexico	NM
New York	NY
North Carolina	NC
North Dakota	ND
Ohio	OH

State	CODE
Oklahoma	OK
Oregon	OR
Pennsylvania	PA
Rhode Island	RI
South Carolina	SC
South Dakota	SD
Tennessee	TN
Texas	TX
Utah	UT
Vermont	VT
Virginia	VA
Washington	WA
West Virginia	WV
Wisconsin	WI
Wyoming	WY

Note: "Maryland" includes the District of Columbia.

**Table 3: Canadian Provinces and Territories Listing.**

Province/ Territory	CODE
Alberta	AB
British Columbia	BC
Manitoba	MB
New Brunswick	NB
Newfoundland and Labrador	NL
Nova Scotia	NS
Northwest Territories	NT
Nunavut	NU
Ontario	ON
Prince Edward Island	PE
Quebec	QC
Saskatchewan	SK
Yukon	YT



## W1AW Operating Schedule

Updated March 14, 2022

Pacific	Mtn	Cent	East	UTC		Mon	Tue	Wed	Thu	Fri
6 am	7 am	8 am	9 am	1300z			Fast Code	Slow Code	Fast Code	Slow Code
7 am to 12:45 pm	8 am to 1:45 pm	9 am to 2:45 pm	10 am to 3:45 pm	1400z to 1945z		<b>Visiting Operator Time</b>				
1 pm	2 pm	3 pm	4 pm	2000z		Fast Code	Slow Code	Fast Code	Slow Code	Fast Code
2 pm	3 pm	4 pm	5 pm	2100z		Code Bulletin				
3 pm	4 pm	5 pm	6 pm	2200z		Digital Bulletin				
4 pm	5 pm	6 pm	7 pm	2300z		Slow Code	Fast Code	Slow Code	Fast Code	Slow Code
5 pm	6 pm	7 pm	8 pm	0000z		Code Bulletin				
6 pm	7 pm	8 pm	9 pm	0100z		Digital Bulletin				
6:45 pm	7:45 pm	8:45 pm	9:45 pm	0145z		Voice Bulletin				
7 pm	8 pm	9 pm	10 pm	0200z		Fast Code	Slow Code	Fast Code	Slow Code	Fast Code
8 pm	9 pm	10 pm	11 pm	0300z		Code Bulletin				

**W1AW's transmitting schedule occurs at the same local Eastern time throughout the year.**

The schedule may change if your local time does not have seasonal adjustments.

#### Daily Morse Code Practice QST Source

Code practice text is from the pages of *QST* magazine, the League's membership journal. The source is given at the beginning of each practice session and alternate speeds within each session. For example, "Text is from *December 2019 QST*, pages 46" indicates that the practice session's plain text is from the article on page 46.

[Click here](#) to see the table for each daily Morse Code Practice text.

#### Morse Code Transmissions

**Frequencies** are 1.8025, 3.5815, 7.0475, 14.0475, 18.0975, 21.0675, 28.0675, 50.350, and 147.555 MHz.

**Slow Code** = practice sent at 5, 7-1/2, 10, 13 and 15 words per minute (wpm).

**Fast Code** = practice sent at 35, 30, 25, 20, 15, 13 and 10 wpm.

**Code bulletins** are sent at 18 wpm.

CW frequencies include code practices, Qualifying Runs and CW bulletins.

**World Wide Web:** You can also find *W1AW code practice* here on *ARRLWeb*, in MP3 format. Other resources can be found on the *ARRLWeb* Learn CW page.

**W1AW Qualifying Runs** are sent on the same frequencies as the Morse code transmissions. West Coast Qualifying Runs are also transmitted monthly by K6KPH, K9JM or KH6TU on 3590 kHz, as well as 3581.5, 7047.5, 14047.5, 18097.5, and 21067.5 kHz. At the beginning of each code practice session, the schedule for the next qualifying run is presented. Underline one minute of the highest speed you copied, certify that your copy was made without aid, and send it to ARRL for grading. Please include your name, call sign (if any) and complete mailing address. The initial certificate is available for a \$10 fee. Subsequent endorsement stickers are available for a \$7.50 fee.

#### Digital Transmissions

**Frequencies** are 3.5975, 7.095, 14.095, 18.1025, 21.095, 28.095, 50.350, and 147.555 MHz.

**Bulletins** are sent using 45.45-baud Baudot, PSK31 in BPSK mode and MFSK16 on a daily revolving schedule. The actual daily schedule can be found [here](#).

**Keplerian elements** for many amateur satellites will be sent on the regular digital frequencies on Tuesdays and Fridays at 6:30 PM Eastern Time using Baudot and PSK31.

#### Voice Transmissions

**Frequencies** are 1.855, 3.99, 7.29, 14.29, 18.16, 21.39, 28.59, 50.350, and 147.555 MHz.

Voice transmissions on 7.290 MHz are in AM, double-sideband full-carrier.

#### W1AW EchoLink Conference Server - W1AWBDCT

Audio from W1AW's CW code practices and CW/digital/phone bulletins is available using EchoLink via the W1AW Conference Server "**W1AWBDCT**." The monthly W1AW Qualifying Runs are presented here as well. The audio is sent in real-time and runs concurrently with W1AW's regular transmission schedule.

All users who connect to the conference server are muted. Please note that any questions or comments about this server should not be sent via the "Text" window in EchoLink. Please send any questions or comments to [w1aw@arrl.org](mailto:w1aw@arrl.org).

Please note that W1AW is also present on the list of active EchoLink stations. However, W1AW is listed as "**BUSY**" since this connection is used for the conference server.

Information about EchoLink can be found at <http://www.echolink.org>.



## Q-Signals

Q-signals are a system of radio shorthand as old as wireless and developed from even older telegraphy codes. Q-signals are a set of abbreviations for common information that save time and allow communication between operators who don't speak a common language. Modern ham radio uses them extensively. The table below lists the most common Q-signals used by hams. While Q-signals were developed for use by Morse operators, their use is common on phone, as well. You will often hear, "QRZed?" as someone asks "Who is calling me?" or "I'm getting a little QRM" from an operator receiving some interference or "Let's QSY to 146.55" as two operators change from a repeater frequency to a nearby simplex communications frequency.

Q-Signals	
Abbr.	Questions
QRG	Your exact frequency (or that of _____) is _____ kHz. Will you tell me my exact frequency (or that of _____)?
QRL	I am busy (or I am busy with _____). Are you busy? Usually used to see if a frequency is busy.
QRM	Your transmission is being interfered with _____ (1. Nil; 2. Slightly; 3. Moderately; 4. Severely; 5. Extremely.) Is my transmission being interfered with?
QRN	I am troubled by static _____. (1 to 5 as under QRM.) Are you troubled by static?
QRO	Increase power. Shall I increase power?
QRP	Decrease power. Shall I decrease power?
QRQ	Send faster (_____ wpm). Shall I send faster?
QRS	Send more slowly (_____ wpm). Shall I send more slowly?
QRT	Stop sending. Shall I stop sending?
QRU	I have nothing for you. Have you anything for me?
QRV	I am ready. Are you ready?
QRX	I will call you again at _____ hours (on _____ kHz). When will you call me again? Minutes are usually implied rather than hours.
QRZ	You are being called by _____ (on _____ kHz). Who is calling me?
QSB	Your signals are fading. Are my signals fading?
QSK	I can hear you between signals; break in on my transmission. Can you hear me between your signals and if so can I break in on your transmission?
QSL	I am acknowledging receipt. Can you acknowledge receipt (of a message or transmission)?
QSO	I can communicate with _____ direct (or relay through _____). Can you communicate with _____ direct or by relay?
QSP	I will relay to _____. Will you relay to _____?
QST	General call preceding a message addressed to all amateurs and ARRL members. This is in effect "CQ ARRL."
QSX	I am listening to _____ on _____ kHz. Will you listen to _____ on _____ kHz?
QSY	Change to transmission on another frequency (or on _____ kHz). Shall I change to transmission on another frequency (or on _____ kHz)?
QTC	I have _____ messages for you (or for _____). How many messages have you to send?
QTH	My location is _____. What is your location?
QTR	The time is _____. What is the correct time?

ITU Phonetic Alphabet		
Letter	Word	Pronunciation
A	Alfa	<b>AL FAH</b>
B	Bravo	<b>BRAH VOH</b>
C	Charlie	<b>CHAR LEE</b>
D	Delta	<b>DELL TAH</b>
E	Echo	<b>ECK OH</b>
F	Foxtrot	<b>FOKS TROT</b>
G	Golf	<b>GOLF</b>
H	Hotel	<b>HOH TELL</b>
I	India	<b>IN DEE AH</b>
J	Juliet	<b>JEW LEE ETT</b>
K	Kilo	<b>KEY LOH</b>
L	Lima	<b>LEE MAH</b>
M	Mike	<b>MIKE</b>
N	November	<b>NO VEM BER</b>
O	Oscar	<b>OSS CAH</b>
P	Papa	<b>PAH PAH</b>
Q	Quebec	<b>KEH BECK</b>
R	Romeo	<b>ROW ME OH</b>
S	Sierra	<b>SEE AIR RAH</b>
T	Tango	<b>TANG GO</b>
U	Uniform	<b>YOU NEE FORM</b>
V	Victor	<b>VIK TAH</b>
W	Whiskey	<b>WISS KEY</b>
X	X-Ray	<b>ECKS RAY</b>
Y	Yankee	<b>YANG KEY</b>
Z	Zulu	<b>ZOO LOO</b>

**Note:** The **boldfaced** syllables are emphasized. The pronunciations shown in this table were designed for those who speak any of the international languages. The pronunciations given for "Oscar" and "Victor" may seem awkward to English-speaking people in the US.

## Intro to digital using WSJT-X.

The following are some of the digital modes that can be used with WSJT-X.

FST 4

FT 4

FT 8, very popular on hf but originally developed for EME(moon bounce).

JT 4

JT9

JT65

Q65

Think of digital as just another way to communicate like CW, SSB, AM, and FM.

Setting up WSJT-X may vary between radios, but this is how I have mine set up and it will be close to what you will use. I have a Yaesu FTDX-3000 hf radio.

Google wsjt-x download. Download the latest software and run the install. Follow the directions.

All the menu items not shown and additional software associated with this app are beyond the scope of this presentation.

Here is a few apps that might be of interest. Excellent instructions for these can found on You Tube, search.

FLDigi – another interface for many digital modes

Ham Radio Deluxe – does many things such as controlling the radio and logging  
Grid tracker, highly advanced mapping of real-time and historical contacts on a  
highly customizable, interactive map.

PSK reporter – similar to Grid tracker

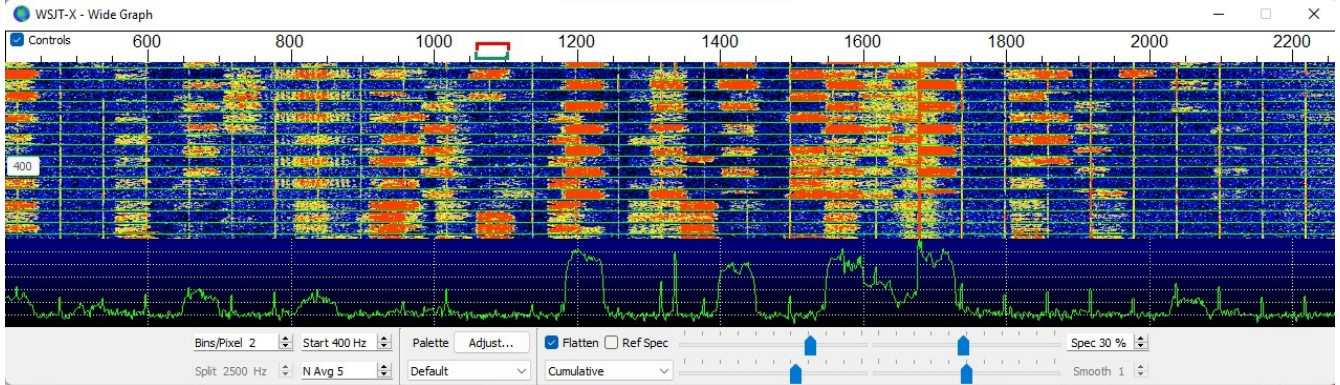
JS8call – keyboard to keyboard

JTSync – time sync another station

Dimension 4 – time sync app

# Run WSJT-X

Click on file, settings and the general tab.



WSJT-X v2.6.0-rc2 by K1JT et al.

File Configurations View Mode Decode Save Tools Help

Band Activity					Rx Frequency				
UTC	dB	DT	Freq	Message	UTC	dB	DT	Freq	Message
165230	-9	-0.7	1405	~ N4GBK N7WFK 73	165230	-9	-0.7	1058	~ CQ R/RK CN97 U.S.A.
165230	8	-0.6	1552	~ W2INF KI7PM 73	164945	-17	-0.7	1058	~ AK0Z KG2EL EL87
165230	-11	-0.6	1897	~ LX1HD HI8RTB -24	165000	Tx		1059	~ KG2EL AK0Z -17
165230	-13	-0.7	704	~ K5EDN K7FR CN97	165015	-2	-0.4	1064	~ K04TSO K4QAL 73
165230	-6	-0.6	1598	~ CQ NU5K EL29 U.S.A.	165015	-15	-0.7	1058	~ AK0Z KG2EL R-02
165230	-11	0.0	1594	~ N0DOW N1GNX 73	165030	Tx		1059	~ KG2EL AK0Z RR73
165230	-21	-0.6	2090	~ CQ KB5WCK EM50 a7 U.S.A.	165045	-18	-0.7	1058	~ AK0Z KG2EL 73 a7

CQ only  
  Log QSO  
   
  
  
  
  
  
  
 Menus

20m  
 S  
14.074 000  
 Tx even/1st  
 Hold Tx Freq

H  
  
  
 Tx 1059 Hz  
  

FT8  
  
  
 Rx 1058 Hz  

Az: 152  
 1066 mi  
 Auto Seq  

 
 Next  
 Now  
 Pwr

 
 Tx 1

 
 Tx 2

 
 Tx 3

 
 Tx 4

 
 Tx 5

 
 Tx 6

Receiving  
FT8  
 Last Tx: KG2EL AK0Z RR73  
17  
9/15   WD:6m

## General tab

Settings

General Radio Audio Tx Macros Reporting Frequencies Colors Advanced

Station Details

My Call:  My Grid:   AutoGrid IARU Region:

Message generation for type 2 compound callsign holders:

Display

Start new period decodes at top

Blank line between decoding periods

Display distance in miles

Tx messages to Rx frequency window

Show DXCC, grid, and worked-before status  Show principal prefix instead of country name

Highlight DX Call in message  Highlight DX Grid in message

Behavior

Monitor off at startup  Enable VHF and submode features

Monitor returns to last used frequency  Allow Tx frequency changes while transmitting

Double-click on call sets Tx enable  Single decode

Disable Tx after sending 73  Decode after EME delay

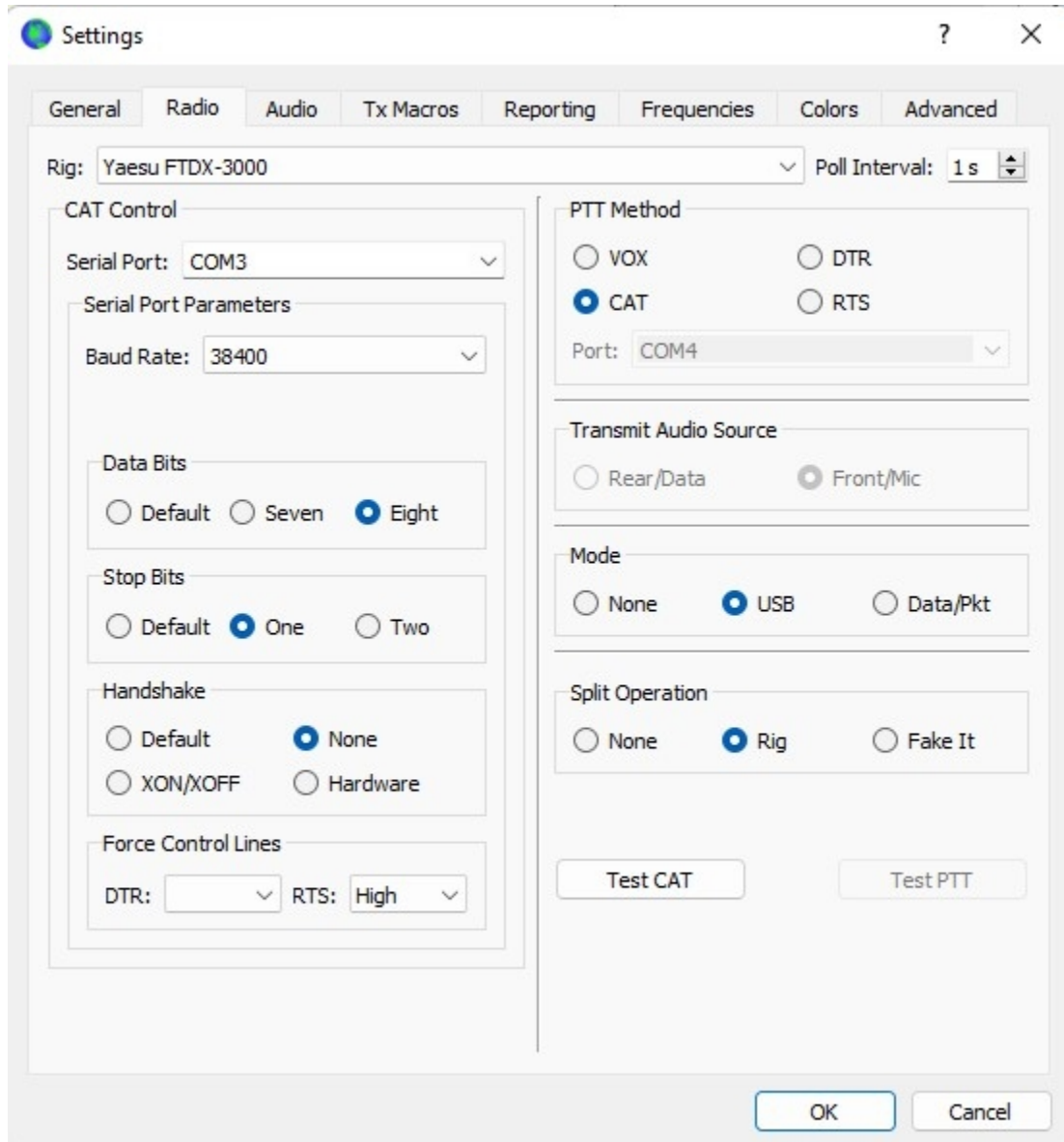
Calling CQ forces Call 1st  Disable Tune watchdog

Alternate F1-F6 bindings Tx watchdog:

CW ID after 73 Periodic CW ID Interval:

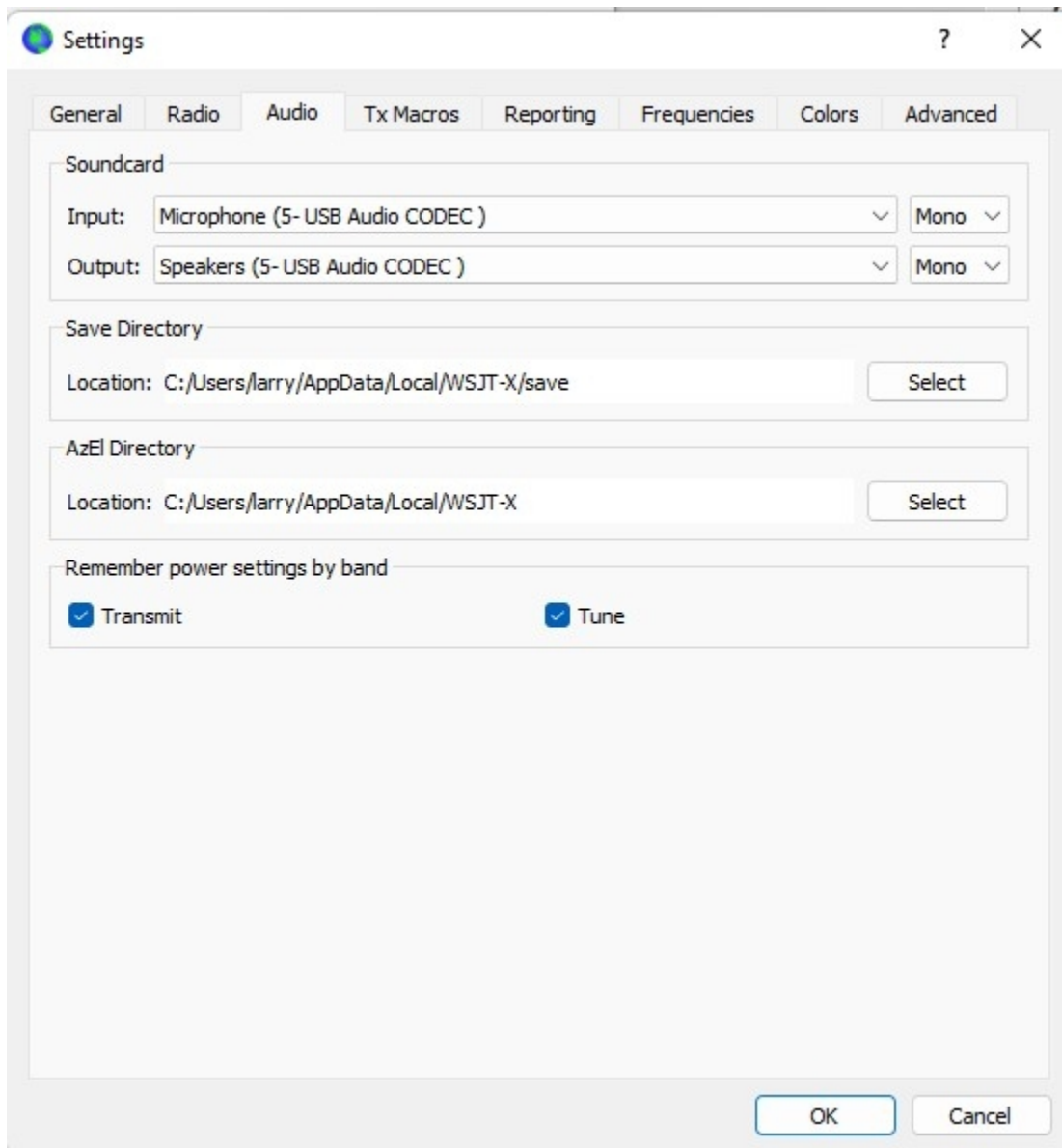


## Radio tab





## Audio tab



## **Setting up your radio for digital modes using WSJT-X, Yaesu FTDX-3000 and Windows 11. Your radio maybe different.**

Download your com port drivers from your radio's web site. There will be a txt file telling you how to install the drivers. Next hookup your A/B USB cable between your radio and computer, (U023-006)@ Amazon. Open Device Manager and click on com ports. One of the ports should be the Enhanced port. This is the number you will use in settings for WSJT-X. If your radio doesn't have a sound card you will need something like the Signalink external sound card which comes with cables, order for your radio.

Set your band pass filter to 3k or width narrower depending on your waterfall.

AGC to either off or fast.

ALC adjust the PWR slider to zero or just a few bars, no more no less.

RF Gain to show on the scale to the left on WSJT-X to a reading of about 60db.

Under radio menu.

#38= 38400bps, this will be the same rate in WSJT-X settings.

#75= USB

#103= USB

Check your computer time for accuracy. It must be within 1 second. Use web site Time.is to check this. If not within 1 second, go to Windows settings and select Time and Language. Then date and time and click on sync now. Go to Time.is again and check, the time should say exact or less than 1 second. An app called Dimension 4 is also available to sync your computer clock and JTSync that allows you to sync to a specific call sign.