

# Resources for Learning Morse Code

Hamfesters Amateur Radio Club

Document Distribution **TLP:WHITE**  
Document Classification: **Not Classified**

**2<sup>nd</sup> Draft**

Version 2021.02-B

Created 2021-02-09 @ 17:00 by GDR

Updated 2021-02-17 @ 14:15 by GDR

Edited by Gregory D. Rosenberg (AB9MZ)  
ab9mz@arrl.net

+1 708-444-2690 Office

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## Document History

This table lists all significant changes to this document.

Date	Version	By	Description of Change
2021-02-10	2021.02-A	Gregg (AB9MZ)	Original Document
2021-02-17	2021.02-B	Gregg (AB9MZ)	Cleaned up grammar and spelling. Reduced white space.

Table 1 Document Change History

## The 5 Bad Habits of CW:

Our CWOps Academy Instructor Ken (AC5EZ) offers the following advice/

- 1) Counting dits and dahs – The best way to stop counting dits and dahs is to keep the character speed at 25 to 30 wpm or above. Extra spacing will be placed between the characters to slow the actual speed.
- 2) Mental lookup table (and other extra steps) - You must eliminate every mental process between hearing the characters and recognizing them. The Morse character must be equivalent to the sound of the character itself in your mind. You hear di-di-dah-dit, and F pops into your mind. No extra steps!
- 3) Holding on to unrecognized characters – You must drop missed characters immediately in order to be ready for the next character. This “Letting Go” is a skill that takes practice and requires you to get comfortable missing characters. Always be ready for the next character - MISS FAST!
  1. DO NOT pause and ponder!
- 4) Crutches – Pencils, decoders, etc. - These “tools” destroy your goal of comfortably copying the code. They are not “training wheels.” They are a hard obstacle. Just close your eyes and listen. Relax about missed characters – that’s not failure; it’s normal. Get used to it!
- 5) Not Getting on the Air – You may think “When I improve my CW proficiency I’ll get on the air.” The truth is: “When I get on the air, I will improve my CW proficiency.”

**MORSE CODE HEAD COPY ONLY - NO WRITING OR TYPING INSTRUMENT IS TO BE USED FOR COPYING OR SENDING MORSE.**

**WHEN COPYING and SENDING** (Other than from written text),

- **RELAX and CLOSE YOUR EYES**

At first, certainly you will write down all incoming letters. But you should try to relax and copy in your head. At first it will be one word then a phrase. Example is when the other station starts to describe his station. Part of the text may well be a description of his antenna. So, you can expect him to say, "the antenna here is a dipole up 40 feet". So as the letters arrive there is no need to write this phrase down. You are starting to copy in your head. Soon you will expand your skill in copying without writing down everything. Practice by listening to other slow speed CW QSOs and see how much you can copy in your head. You may be surprised. Do this while you are working in the shop with your shortwave receiver on. Listen to the ongoing QSO in the background. You will begin to pick up words and phrases. With practice you will be copying more and more in your head. This will greatly enhance the pleasure of conversing in Morse Code. Becoming a good skilled CW op is pride filling and if you are into DXing or contesting, worth much to your success.

- **THERE ARE NO SHORTCUTS:**

Instant Character Recognition is the foundation of CW Head Copy. Keep practicing Instant Character Recognition throughout this course and beyond!

**PRACTICE, PRACTICE, PRACTICE!**

## Daily Morse Code “Scales” Sending Warm Up

Bob Carter – (WR7Q) 2018-12-09

- Do the “Warm Up” every day before you send anything
- Do the “Exercise” as needed...to get better at letters and numbers
- Do the “Drill” as needed...to increase your sending skills

Send all five characters or each word without error or start “it” again:

### Warm Up

EEEEE TTTTT IIIII MMMMM SSSSS OOOOO HHHHH 00000 55555

AAAAA NNNNN UUUUU DDDDD VVVVV BBBB 4444 6666

ABCDEF GHIJK LMNOP QRSTU VWXYZ 12345 67890 / , . ?

THE QUICK BROWN FOX JUMPS OVER THE LAZY DOGS BACK 7 0 3 6 4 5 1 2 8 9

### Exercise

AAAAA BBBB CCCCC DDDDD EEEEE FFFFF GGGGG HHHHH IIIII JJJJ

KKKKK LLLLL MMMMM NNNNN OOOOO PPPP QQQQ RRRR

SSSS TTTT UUUU VVVV WWWW XXXX YYYYY ZZZZ

1111 2222 3333 4444 5555 6666 7777 8888 9999 0000

### Drill

THE QUICK BROWN FOX JUMPS OVER THE LAZY DOGS BACK 7 0 3 6 4 5 1 2 8 9

THE QUICK BROWN FOX JUMPS OVER THE LAZY DOGS BACK 7 0 3 6 4 5 1 2 8 9

BENS BEST BENT WIRE/5 BENS BEST BENT WIRE/5 BENS BEST BENT WIRE/5

//// , , , , ... . ???? \*\*\*\*\* +++++ =====

$\overline{DN}$   $\overline{SK}$   $\overline{AK}$   $\overline{AR}$   $\overline{BK}$   $\overline{BT}$

## Slow Speed CW Nets

Updated 2021-02-15

NET	PURPOSE	FREQ +/-	TIME Eastern	DAYS	Net Control Station
<a href="#">Carolina Slow Net (CSN)</a> <sup>1</sup>	Traffic/Practice	3.571.00	2000	Daily	W4EAT
<a href="#">Empire Slow Speed (ESS)</a>	Traffic/Training	3.576.00	1800	Daily	WI2G
Florida Med.Speed Net	Traffic/Training	3.552.00	1830	Daily	AG4RJ
<a href="#">Georgia CW Training Net</a> <sup>1</sup>	Traffic/Training	3.549.00	2100	Daily	WE4GA
<a href="#">Hit and Bounce Slow Net</a> <sup>1</sup>	Traffic/Training	7.112.00	0730	Daily	N7MPS
Hoodview CW Net <sup>2</sup>	CW Practice	28.130.00	1900	Daily	AB7BI
<a href="#">Idaho Montana CW Net</a> <sup>2</sup>	Traffic/Training	3.647.00	1900	Daily	N7MPS
<a href="#">K9YA Slow Net</a> <sup>1</sup>	Practice/Fun	7.122.00	1900	Thursday	N9BOR
<a href="#">LIDS QRS CW Net</a>	Practice	7.035.00	None	None	By arrangement
<a href="#">Maine Slow Speed Net</a> <sup>1</sup>	Training	3.585.00	1800	Weekdays	KA1LPW
<a href="#">Maryland CW Slow Net (MSN)</a> <sup>1</sup>	Traffic/Training	3.563.00	1930	Daily	W8CPG
Midsouth CW Training Net	Training	3.593.00	1800	Daily	WD4PTJ
<a href="#">NAQCC QRS Net</a> <a href="#">East Texas QRS Net (ETN)</a> MIDWEST QRS Net (MWN) <a href="#">Pacific Northwest 80 Net (PNW80)</a> 1Land QRS Net (1LND)	Traffic/Training Summer Winter	7.066.00 3.566.00 7.031.00 3.556.50 3.560.00	2000 2000 2030 2000 1900	Tuesday Tuesday Tuesday Thursday 2 <sup>nd</sup> /4 <sup>th</sup> Sunday	Allen KA5TJS TX Allen KA5TJS TX Bob W0CC KS Stewart KE7LKW Ed K1RID (ME)



NET	PURPOSE	FREQ +/-	TIME Eastern	DAYS	Net Control Station
NARL CW Slow Net	Traffic/Training	28.180.00	0730	Daily	AA1GW
NJ CW Slow Net	Traffic/Training	3.547.00	1830	Daily	K2PB
<a href="#">Northern CA Slow Net</a> <sup>1</sup>	Traffic/Training	3.705.00	2100	Daily	WB6UZX
<a href="#">Ohio CW Slow Net</a> <sup>1</sup>	Traffic/Training	3.705.00	1810	Daily	WD8Q
Oklahoma CW Training Net	Traffic/Training	7.120.60	1720	Daily	WB5KND
<a href="#">Oregon Section Net</a> <sup>1</sup>	Practice/Chat Traffic/Training Traffic/Training	7.085.00 3.587.00 3.587.00	900 2200 1830	Daily Daily Daily	KC7SRL KC7SRL W7IZ
PA CW Training Net	Code Practice	3.537.00	1830	Daily	N3SW
Sandia Valley Slow Net	Code Practice	7.063.00	2100	Wed	WB7RHT
<a href="#">Tennessee Slow Speed Net</a>	Training	3.682.00	2030	Daily	
<a href="#">Texas Slow Net (TSN)</a> <sup>1</sup>	Traffic/Training	3.552.00	1945	Daily	W5ESE
<a href="#">Utah CW Net</a> <sup>1</sup>	Traffic/Training	3.570.00	1930	Daily	NA7G
<a href="#">VE2UMS CW Traffic Net</a> <sup>1</sup>	Traffic	3.578.00	2000	Daily	VE2CBW
<a href="#">West Coast Slow Net</a> <sup>1</sup>	Traffic/Training	3.540.00	1900	Daily	K7WCN

Table 2 Slow Speed CW Nets

## W1AW Operating Schedule

*Updated 2021-01-04*

Pacific	Mountain	Central	Eastern	UTC	Monday	Tuesday	Wednesday	Thursday	Friday
06:00	07:00	08:00	09:00	1400z		Fast	Slow	Fast	Slow
07:00	08:00	09:00	10:00	1500z					
10:00	11:00	12:00	13:00	1800z					
13:00	14:00	15:00	16:00	2100z	Fast	Slow	Fast	Slow	Fast
14:00	15:00	16:00	17:00	2200z	<a href="#">Code Bulletin</a>				
15:00	16:00	17:00	18:00	2300z	<a href="#">Digital Bulletin</a>				
16:00	17:00	18:00	19:00	0000z	Slow	Fast	Slow	Fast	Slow
17:00	18:00	19:00	20:00	0100z	Code Bulletin				
18:00	19:00	20:00	21:00	0200z	Digital Bulletin				
18:45	19:45	20:45	21:45	0245z	<a href="#">Voice Bulletin</a>				
19:00	20:00	21:00	22:00	0300z	Fast	Slow	Fast	Slow	Fast
20:00	21:00	22:00	23:00	0400z	Code Bulletin				
<p>W1AW's transmitting schedule occurs at the same local Eastern time throughout the year.</p> <p>The schedule may change if your local time does not have seasonal adjustments.</p>									

*Table 3 W1AW Operating Schedule*

## Morse Code - Web Resources

### Learning and Resource Websites

Site Owner / Maintainer	Description / Website
CWops CW Academy	Home: <a href="https://cwops.org/cw-academy">https://cwops.org/cw-academy</a> Student Resources: <a href="https://cwops.org/cw-academy-2/cw-academy-student-resources">https://cwops.org/cw-academy-2/cw-academy-student-resources</a> Morse Code Trainer: <a href="https://morsecode.world/international/trainer/trainer.html">https://morsecode.world/international/trainer/trainer.html</a>
Straight Key Country Club (SKCC)	Beginners Corner: <a href="http://www.skccgroup.com/member_services/beginners_corner">http://www.skccgroup.com/member_services/beginners_corner</a>
A Beginner's Guide to Making CW Contacts By Jack Wagoner WB8FSV	<a href="http://felge.us/BeginGuideCW.htm">http://felge.us/BeginGuideCW.htm</a>
Deep Morse (Puzzles)	This site has a collection of CW Puzzles that test your ability to copy Morse code (also known as CW). Each Puzzle has been curated and contains some specific challenge that makes it difficult to copy CW. <a href="https://deepmorse.com">https://deepmorse.com</a>
Master CW	<a href="https://www.mastercw.com">https://www.mastercw.com</a>
Seiuchy	<a href="http://seiuchy.macache.com">http://seiuchy.macache.com</a>
LCWO	<a href="http://lcwo.net">http://lcwo.net</a>
Lockdown Morse	<a href="https://www.youtube.com/channel/UCu8HOu-LB4pY4WKLYKarYNg">https://www.youtube.com/channel/UCu8HOu-LB4pY4WKLYKarYNg</a>
Morse Camp	<a href="https://morse.camp">https://morse.camp</a>
AA9PW Code Practice	<a href="http://aa9pw.com/morsecode">http://aa9pw.com/morsecode</a>
Morse Code Ninja	Code Course: <a href="https://morsecode.ninja/learn/index.html">https://morsecode.ninja/learn/index.html</a> Practice: <a href="https://morsecode.ninja/practice/index.html">https://morsecode.ninja/practice/index.html</a>

Table 4 Learning and Resource Websites

## Morse Code - Learning and Reference Software

### *Software that runs on Microsoft Windows*

Author / Software / Version	Description / Website
G4FON Koch Morse Trainer V10	Probably the most popular computer program is <i>Ray Goff G4FON's Koch Morse Trainer</i> . This uses the proven Koch Method and provides additional features for improvers such as Word training. You can also use it to convert text files into Morse code. The program can be used to generate Windows sound (.wav) files. By installing some free MP3 software, you can also use it to generate MP3 files for your MP3 player. <a href="http://www.g4fon.net/CW_Trainer2.php">http://www.g4fon.net/CW_Trainer2.php</a>
Tancredi Mathias Kolpe, DL4MM & Alessandro Vitiello, IV3XYM, RufzXP 2019-09-23	RufzXP is an excellent training program for improving code speed and CW practice, particularly (ultra) high speed memory copying of true amateur radio calls. Focusing on improvement of CW proficiency, it is no contest simulator and does not provide for QRM. It provides additional tools for keeping track of training progress and comparing with other operators via International RufzXP. <a href="http://www.rufzxp.net">http://www.rufzxp.net</a>
Just Learn Morse Code	Just Learn Morse Code is designed to make it easy to learn Morse code, as well as improve the skills of those who already know the code. The basic methods used to achieve this are <a href="#">Koch's method</a> and <a href="#">Farnsworth timing</a> . <a href="http://justlearnmorsecode.com">http://justlearnmorsecode.com</a>
NA0N Iambic Master	<a href="https://sites.google.com/site/korkowpl/iambic-master">https://sites.google.com/site/korkowpl/iambic-master</a>
AA9PW Code Practice	<a href="http://aa9pw.com/morsecode">http://aa9pw.com/morsecode</a>
Morse Machine	<a href="http://www.g4ilo.com/morse-machine.html">http://www.g4ilo.com/morse-machine.html</a>
CW Freak.NET Callsign Trainer Satoshi Imaizumi JI0VWL	For those who have mastered the basics, the CW Freak.NET program provides callsign training. As you copy callsigns correctly, the speed gradually increases. You can also see how you compare to other users worldwide by looking at your place in the international monthly, yearly, and permanent ratings. <a href="https://web.ji0vwl.net/cw_freak_net.html">https://web.ji0vwl.net/cw_freak_net.html</a> (English) <a href="http://www.ji0vwl.com/cw_freak_net.html">http://www.ji0vwl.com/cw_freak_net.html</a> (Japanese)

Table 5 Software that runs on Microsoft Windows, Apple Mac OS, or Linux

**Software that runs on Windows or Mac OS**

Software / Version	Description / Website
Morse Runner v10 Afreet Software, Inc. Alex Shovkopyas VE3NEA	The Morse Runner program simulates contest pile ups with interference from other stations etc. Even if you're not interested in taking part in contests, this program can be fun and help you learn to cope when conditions get busy on the air. <a href="http://www.dxatlas.com/MorseRunner">http://www.dxatlas.com/MorseRunner</a>  Detrick KI4STU has created a <a href="#">WineSkin wrapper</a> for Morse Runner to run it on the Mac computers.

Table 6 Software that runs on Windows or Mac OS

**Software that runs on Windows, Mac OS, or Linux**

Software / Version	Description / Website
QRQ	<a href="https://fkurz.net/ham/qrq.html">https://fkurz.net/ham/qrq.html</a>
CW Teacher	<a href="http://www.n3fjp.com/cwteacher.html">http://www.n3fjp.com/cwteacher.html</a>
CyberCW Contest	<a href="http://bbcyber.com/cybertest.htm">http://bbcyber.com/cybertest.htm</a>
ebook2cw	<a href="https://fkurz.net/ham/ebook2cw.html">https://fkurz.net/ham/ebook2cw.html</a>

Table 7 Software that runs on Windows, Mac OS, or Linux

**Software that runs on Apple iOS and iPadOS**

Software / Version	Description / Website
Morse-IT (Free/\$)	<a href="https://pacolabs.com/iOS/MorseIt/">https://pacolabs.com/iOS/MorseIt/</a>
Morse Toad (\$)	<a href="https://itunes.apple.com/us/app/morse-toad/id906586079?mt=8">https://itunes.apple.com/us/app/morse-toad/id906586079?mt=8</a>

Table 8 Software that runs on Apple iOS and iPadOS

### Software that runs on Google Android OS

Software / Version	Description / Website
IZ2UUF Morse Koch CW (Free)	<a href="https://play.google.com/store/apps/details?id=net.iz2uuf.cwkoch&amp;hl=en">https://play.google.com/store/apps/details?id=net.iz2uuf.cwkoch&amp;hl=en</a>
AE0S Claus' Morse Trainer (Free)	<a href="https://play.google.com/store/apps/details?id=com.niesens.morsetrainer">https://play.google.com/store/apps/details?id=com.niesens.morsetrainer</a>
Koch Morse Trainer Pro (\$)	<a href="https://play.google.com/store/apps/details?id=uk.co.bitninja.kmtpro&amp;hl=en_US">https://play.google.com/store/apps/details?id=uk.co.bitninja.kmtpro&amp;hl=en_US</a>
Morse Machine for Ham Radio (\$)	<a href="https://play.google.com/store/apps/details?id=com.iu4apc.morsemachine&amp;hl=en_US">https://play.google.com/store/apps/details?id=com.iu4apc.morsemachine&amp;hl=en_US</a>
KG9E Practice Oscillators Japanese (\$)	<a href="https://play.google.com/store/apps/details?id=appinventor.ai_izzybella419.AmateurHamRadioPracticeKeysWabun">https://play.google.com/store/apps/details?id=appinventor.ai_izzybella419.AmateurHamRadioPracticeKeysWabun</a>
KG9E Morse code trainer (\$)	10 WPM <a href="https://play.google.com/store/apps/details?id=appinventor.ai_izzybella419.MorseCodeTrainer10WPM">https://play.google.com/store/apps/details?id=appinventor.ai_izzybella419.MorseCodeTrainer10WPM</a> 15 WPM <a href="https://play.google.com/store/apps/details?id=appinventor.ai_izzybella419.MorseCodeTrainer15WPM">https://play.google.com/store/apps/details?id=appinventor.ai_izzybella419.MorseCodeTrainer15WPM</a> 20 WPM <a href="https://play.google.com/store/apps/details?id=appinventor.ai_izzybella419.MorseCodeTrainer20WPM">https://play.google.com/store/apps/details?id=appinventor.ai_izzybella419.MorseCodeTrainer20WPM</a> 25 WPM <a href="https://play.google.com/store/apps/details?id=appinventor.ai_izzybella419.MorseCodeTrainer25WPM">https://play.google.com/store/apps/details?id=appinventor.ai_izzybella419.MorseCodeTrainer25WPM</a> 30 WPM <a href="https://play.google.com/store/apps/details?id=appinventor.ai_izzybella419.MorseCodeTrainer30WPM">https://play.google.com/store/apps/details?id=appinventor.ai_izzybella419.MorseCodeTrainer30WPM</a>
Caller name in Morse code (?)	<a href="http://100dof.com/software/morsenotifier/morse_notifier_free_303.apk">http://100dof.com/software/morsenotifier/morse_notifier_free_303.apk</a>

Table 9 Software that runs on Google Android OS.

**Amazon Alexa Skills**

Skill Author / Maintainer	Description / Website
Continuous Wave	Allows you to learn or practice your Morse code. Say "Alexa Launch Continuous Wave Skill". <a href="https://www.amazon.com/N3HEE-Continuous-Wave/dp/B07C7HS47J">https://www.amazon.com/N3HEE-Continuous-Wave/dp/B07C7HS47J</a>

Table 10 Amazon Alexa Skills.

**MP3 Player Practice Files**

MP3 Audio Resources	Description / Website
<b>W1AW Practice Files</b>	The ARRL (USA national radio society) provides copies of the W1AW Code Practice MP3 Files for various MP3 speeds between 5wpm and 40wpm in MP3 files, which you can either listen to online or download for your player. These provide a mixture of plain language (taken from the ARRL QST magazine) and callsign training. As well as the most recent files, there are hundreds of additional files available. <a href="http://www.arrl.org/code-practice-files">http://www.arrl.org/code-practice-files</a>
South Manchester Radio and Computing Club Practice Files	The S.M.R.C.C. Morse Practice web page provides MP3 Morse files with text, QSOs and letter groups at 12, 18 and 25 w.p.m. <a href="http://smrcc.org.uk/Morse/morse.htm">http://smrcc.org.uk/Morse/morse.htm</a>
K7QO Code Course	<a href="http://www.k7qo.com">http://www.k7qo.com</a>

Table 11 MP3 Player Resources.

## Contest & Calendar sites:

- 3830 Scores: <https://www.3830scores.com/>
- State QSO Parties Calendar: <https://www.contestcalendar.com/stateparties.html>
- Contest Calendar: <https://www.contestcalendar.com/>

## Vanity License sites:

- Radio QTH: <http://www.radioqth.net/>
- Amateur Extra 7 Query tools: <http://ae7q.com/query/>
- Vanity Application Process: <http://ae7q.com/query/text/Vanity.php>
- FCC: <https://www.fcc.gov/wireless/bureau-divisions/mobility-division/amateur-radio-service>
- FCC Vanity Call Sign: <https://www.fcc.gov/wireless/bureau-divisions/mobility-division/amateur-radio-service/amateur-call-sign-systems>

## *How to apply for a vanity call sign (If you're an ARRL member).*

- <http://www.arrl.org/applying-for-a-vanity-call>
- W5YI Group: <http://w5yi-vec.org/page.php?id=269>
- How to Pick Your Own Ham Radio Call Sign: <https://www.dummies.com/programming/ham-radio/how-to-pick-your-own-ham-radio-call-sign> or you can Google "how to apply for a vanity call sign" to find more sites and information.

## Reverse Beacon Networks:

- CW Club RBN Spotter: <https://rbn.telegraphy.de/>
- PSK Reporter: <https://www.pskreporter.de/>
- Reverse Beacon Network: <http://www.reversebeacon.net/>

**Ken, AC5EZ - CW Academy Advisor**



**Books**

Updated 2021-02-10

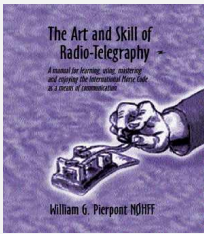
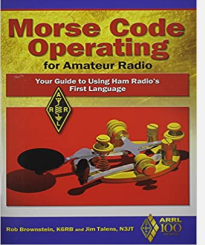
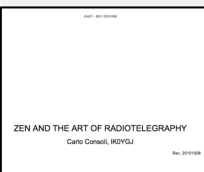
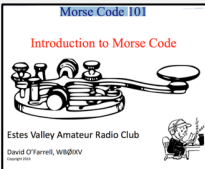

	<p><b>The Art &amp; Skill of Radiotelegraphy.</b> This contains much information on learning Morse to a very high standard and is essential reading for anyone with an interest in Morse code.  <a href="http://www.n9bor.us/index.php/morse-code/the-art-skill-of-radio-telegraphy">http://www.n9bor.us/index.php/morse-code/the-art-skill-of-radio-telegraphy</a></p>		<p><b>Morse Code Operating for Amateur Radio</b>  <i>April 29, 2013</i>                  Amazon.com <a href="https://tinyurl.com/438dzobs">https://tinyurl.com/438dzobs</a></p>
	<p><b>Zen and the Art of Radiotelegraphy</b>                  Another free, downloadable book is <b>Zen and the Art of Radiotelegraphy</b>. This is a Morse tutor book with an emphasis on the psychology. By Carlo Consoli, IK0YGI  <a href="https://www.qsl.net/ik0ygi/enu/ZART_r20101008m.pdf">https://www.qsl.net/ik0ygi/enu/ZART_r20101008m.pdf</a></p>		<p><b>Morse Code 101 – Introduction to Morse Code</b>  <a href="http://evarc.org/Morse%20101.v2P.pdf">http://evarc.org/Morse%20101.v2P.pdf</a></p>
	<p><b>The Morse Code Trainer</b>                  Reaching the pinnacle of CW Operations! Finally, an all-in-one tool for learning and increasing Morse code operations. The Morse Code Trainer enhances the learning experience by immersing the user in word sounds, and how to send words correctly. It also contains the smoothest and most responsive Keyer available and the one and only tool all experienced CW operator must have to enhance their proficiency and operating skills. The Morse Code Trainer will put the DX world, Contesting, and Rag Chewing at your fingertips!  <a href="https://www.qsl.net/k5bcq/Kits/The%20Morse%20Code%20Trainer%20Manual%20Rev%20A04.pdf">https://www.qsl.net/k5bcq/Kits/The%20Morse%20Code%20Trainer%20Manual%20Rev%20A04.pdf</a></p>		

Table 12 Books about Morse Code.

***U.S. Army Training Video from 1966***

Training Video	Description / Website
<p><b>US Army</b> Hand Sending Training film</p>	<p>There's a very entertaining, helpful and humorous US Army training film from 1966 on hand-sending Morse and adjusting keys, entitled INTERNATIONAL MORSE CODE, HAND SENDING. Part of the film covers American style hand/arm positioning, but the majority of the film is very relevant to all styles of sending.</p> <p><a href="http://www.archive.org/details/gov.archives.arc.36813">http://www.archive.org/details/gov.archives.arc.36813</a></p>

Table 13 U.S. Army Training Video from 1966



## Social Media Sites

Social media sites and apps can be a useful resource for finding learning resources, learning what is going on in the CW community, and a great place for asking questions. Although there are hundreds of thousands of social media sites that cover various aspects of Amateur Radio and in particular Morse Code (CW) if I have only included the mainstream sites.

### Facebook

Some Facebook pages are open to the public and some require membership to access.

### CW Ops

This is a closed Facebook group for members of the CWOps CW club. Please do not send request to join this Facebook group unless you are a member of CWOps. You have to send code at 25 WPM to join. <https://www.facebook.com/groups/1621569471440493>

### CW.QRS

<https://www.facebook.com/groups/cw.qrs/>

## Appendix A – CW Operating Aids

Most of the operating aids that are included in this document were provided by Ken AC5EZ who was our CWOps Academy Instructor for our beginner class that started in January / February 2021 ran on Monday and Thursday nights at 19:00 CST.

This appendix contains the following Morse Code learning and operating aids:

- Morse Code Timing Rules
- The most common CW abbreviations, Q-codes, Prosigns, and most commonly used words.
- United States – State, Territory, and Commonwealth Abbreviations
- Procedural Signs (or Prosigns).
- Q-Codes (Q Signals).
- Signal Report (Readability, Signal Strength, and Tone) (RST)).

**NOTE:** Ken provided us with full page printable versions of these operating aids that I printed double-sided and laminated.

## Morse Code Timing Rules

There are rules to help people distinguish dots from dashes in Morse code.

- The length of a dot is 1-time unit.
- A dash is 3-time units.
- The space between dots and dashes of the same letter is 1-time unit.
- The space between letters is 3-time units.
- The space between words is 7-time units.

Source: <http://www.codebug.org.uk/learn/step/541/morse-code-timing-rules>

<b>Letters</b>	H									W										
<b>Code Symbols</b>	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
<b>Timing Elements</b>	1	1	1	1	1	1	1	1	1	3	3	3	3	3	3	3	3	3	3	3

Table 14 Morse Code Spacing.

***The most common CW abbreviations Q-codes, Prosigns, and most used words.***

Common CW Abbreviations			
AGN	Repeat, Say again	HW?	How copy
ANT	Antenna	NAME	Name
CPY	Copy	NR	Number
CQ	Calling any station	OM	Old man
CW	Continuous wave	PSE	Please
DE	This is	PWR	Power
DX	long distance	R	Received
ES	And	RPT	Report
FB	Fine business	RST	Signal report
FER	For	SLD	Solid
GA	Good afternoon	TKS	Thanks
GD	Good, Good day	TNX	Thanks
GE	Good evening	TU	Thank you
GM	Good morning	WX	Weather
GN	Good night	XYL	Wife
HI	Laughing in CW	YL	Young lady
HR	Here, hear	73	Goodbye
HW	How	88	Love & kisses

Most used Q Signals			
QRL	Is frequency in use	QRZ	Who is calling
QRM	Manmade interference	QSB	Signal fading
QRN	Natural interference	QSY	Change frequency
QRQ	Send faster	QTH	Station location
QRS	Send slower		

ProSigns			
\AR	End of message	\AS	Standby, wait
\BK	Break	\BT	Separation

Most often used words									
I	AND	THE	YOU	THAT	A	TO	KNOW	OF	IT
IN	DO	SO	BUT	IS	LIKE	HAVE	WAS	WE	ITS
JUST	ON	OR	NOT	THINK	FOR	WELL	WHAT	ABOUT	ALL
THATS	OH	ONE	ARE	RIGHT	THEM	AT	THERE	MY	MEAN
DONT	NO	WITH	IF	WHEN	CAN				

Table 15 The most common CW abbreviations Q-codes, Prosigns, and most used words.

**United States – State, Territory, and Commonwealth Abbreviations**

United States – State, Territory, and Commonwealth Abbreviations							
<b>AL</b>	Alabama	<b>AK</b>	Alaska	<b>AZ</b>	Arizona	<b>AR</b>	Arkansas
<b>CA</b>	California	<b>CO</b>	Colorado	<b>CT</b>	Connecticut	<b>DE</b>	Delaware
<b>FL</b>	Florida	<b>GA</b>	Georgia	<b>HI</b>	Hawaii	<b>ID</b>	Idaho
<b>IL</b>	Illinois	<b>IN</b>	Indiana	<b>IA</b>	Iowa	<b>KS</b>	Kansas
<b>KY</b>	Kentucky	<b>LA</b>	Louisiana	<b>ME</b>	Maine	<b>MD</b>	Maryland
<b>MA</b>	Massachusetts	<b>MI</b>	Michigan	<b>MN</b>	Minnesota	<b>MS</b>	Mississippi
<b>MO</b>	Missouri	<b>MT</b>	Montana	<b>NE</b>	Nebraska	<b>NV</b>	Nevada
<b>NH</b>	New Hampshire	<b>NJ</b>	New Jersey	<b>NM</b>	New Mexico	<b>NY</b>	New York
<b>NC</b>	North Carolina	<b>ND</b>	North Dakota	<b>OH</b>	Ohio	<b>OK</b>	Oklahoma
<b>OR</b>	Oregon	<b>PA</b>	Pennsylvania	<b>RI</b>	Rhode Island	<b>SC</b>	South Carolina
<b>SD</b>	South Dakota	<b>TN</b>	Tennessee	<b>TX</b>	Texas	<b>UT</b>	Utah
<b>VT</b>	Vermont	<b>VA</b>	Virginia	<b>WA</b>	Washington	<b>WV</b>	West Virginia
<b>WI</b>	Wisconsin	<b>WY</b>	Wyoming	<b>DC</b>	Washington	<b>AS</b>	American Samoa
<b>GU</b>	Guam	<b>MP</b>	Northern Mariana	<b>PR</b>	Puerto Rico	<b>VI</b>	U.S. Virgin Is.
<b>MH</b>	Marshall Islands	<b>FM</b>	Micronesia	<b>PW</b>	Palau		
Color Key							
	State		Federal District		Commonwealth		Freely Associated State

Table 16 United States – State, Territory, and Commonwealth Abbreviations.

### *The Most Common Procedural Signs (or Prosigns) for Morse Code*

The following table shows the most commonly used procedure signs (Prosigns) used in Morse Code. When sending a Prosign you send the characters together. Prosigns like  $\overline{AK}$  are shown with an overbar. You might also see them show like <SK>. Either designation is your clue to run the characters together.

Prosign	Meaning	Code symbol	Explanation
$\overline{AR}$	<EOM>	■ ■ ■ ■ ■ ■ ■ ■ ■ ■	End of message.
$\overline{AS}$	Stand by	■ ■ ■ ■ ■ ■ ■ ■	Stand by or wait.
$\overline{BK}$	Break-In	■ ■ ■ ■ ■ ■ ■ ■ ■ ■	Emergency break-in.
$\overline{BT}$	Pause	■ ■ ■ ■ ■ ■ ■ ■	Separation (pause while you are thinking).
$\overline{HH}$	Error	■ ■ ■ ■ ■ ■ ■ ■ ■ ■	Sent when you made an error and need to start over. You may here some folks using six dits instead of eight. They call this a shortcut or cut word.
$\overline{SK}$	End of contact	■ ■ ■ ■ ■ ■ ■ ■ ■ ■	Indicates the end of the QSO or contact.

Table 17 Commonly used Procedural Signs (Prosigns).

The following Prosigns are sent as normal characters with the normal 1-element spacing.

<b>AA</b>	All after	■ ■■■■ ■ ■■■■	Please resend all after ...
<b>AB</b>	All before	■ ■■■■ ■■■■ ■■■■	Please send all before ...
<b>BN</b>	All between	■■■■ ■■■■ ■■■■	Please send all between
<b>CL</b>	Closing station	■■■■ ■■■■ ■■■■ ■■■■	
<b>CQ</b>	Call any station	■■■■ ■■■■ ■■■■ ■■■■ ■■■■	General call to any station. CQ CQ CQ DE AB9MZ
<b>DE</b>	This is	■■■■ ■■■■ ■■■■	[his/her callsign] <b>this is</b> [Your callsign].
<b>K</b>	Over	■ ■■■■ ■■■■	Over to you.
<b>SOS</b>	Save our ship	■ ■■■■ ■■■■ ■■■■ ■■■■	Calling for emergency assistance.
<b>?</b>	Say again	■ ■■■■ ■■■■ ■■■■	Can be used to ask a question or to fill in missing letters. Ask how they copied what you sent. <b>HW CPY ?</b> Ask to fill in missing letters in a callsign. <b>AB9?Z</b>

Table 18 Additional procedural signs.



## CW Abbreviations

<b>A</b>		CQ	→ --Calling any station	GS	→ --Green Stamp
AA	→ --All after	CRD	→ --Card	GUD	→ --Good
AA	→ --End Of Line	CS	→ --Call Sign	GV	→ --Give
AB	→ --All before	CU	→ --See You	GVG	→ --Giving
ABT	→ --About	CUAGN	→ --See You Again	<b>H</b>	
ADEE	→ --Addressee	CUD	→ --Could	HH	→ --Error in sending
ADR	→ --Address	CUL	→ --See You later	HI	→ --The telegraph laugh; High
ADS	→ --Address	CUM	→ --Come	HPE	→ --Hope
AGN	→ --Again	CUZ	→ --Because	HQ	→ --Headquarters
AM	→ --Amplitude Modulation	CW	→ --Continuous wave	HR	→ --Here; Hear, Hour
ANI	→ --Any	<b>D</b>		HRD	→ --Heard
ANS	→ --Answer	DA	→ --Day	HRS	→ --Hours
ANT	→ --Antenna	DE	→ --From, This Is	HRD	→ --Heard
AR	→ --End of message	DIFF	→ --Difference	HV	→ --Have
AS	→ --Stand by; wait	DLD	→ --Delivered	HVG	→ --Having
AT	→ --used for the @ sign for E-Mail Addresses	DLVD	→ --Delivered	HVY	→ --Heavy
	→ --New proposal is AC run together	DN	→ --Down	HW	→ --How, How Copy?
		DR	→ --Dear	<b>I</b>	
<b>B</b>		DSW	→ --Russian CW abbreviation for goodbye.	I <sup>o</sup>	→ --I Repeat
B	→ --More to follow	DWN	→ --Down	II	→ --Short form of HH
BCI	→ --Broadcast Interference	DX	→ --Distance	IMI	→ --Repeat, Say Again
BCL	→ --Broadcast Listener	<b>E</b>		INFO	→ --Info
BCNU	→ --Be seeing you	EL	→ --Element	<b>J</b>	
BD	→ --Bad	ES	→ --And	JA	→ --Japanese Station
BK	→ --Break, Break in	ENUF	→ --Enough	<b>K</b>	
BN	→ --All between; Been	EU	→ --Europe	K	→ --Invitation To Transmit
BT	→ --Separation (break)	EVE	→ --Evening	KA	→ --Beginning of message
BTH	→ --Both	<b>F</b>		KLIX	→ --Key Clicks
BTR	→ --Better	FB	→ --Fine Business, excellent	KN	→ --Go only, invite a specific station to transmit
BTW	→ --By The Way	FER	→ --For	<b>L</b>	
BUG	→ --Semi-Automatic key	FM	→ --Frequency Modulation: From	LID	→ --A poor operator
BURO	→ --Bureau	FONE	→ --Phone	LNG	→ --Long
B4	→ --Before	FQ	→ --Frequency	LP	→ --Long Path
<b>C</b>		Freq	→ --Frequency	LSN	→ --Listen
C	→ --Yes, Correct	FWD	→ --Forward	LTR	→ --Later; letter
CB	→ --CallBook	<b>G</b>		LV	→ --Leave
CBA	→ --Callbook Address	GA	→ --Go ahead; Good Afternoon	LVG	→ --Leaving
CFM	→ --Confirm; I confirm	GB	→ --Good bye, God Bless	LW	→ --Long Wire., Long Wave
CK	→ --Check	GD	→ --Good, Good Day	<b>M</b>	
CKT	→ --Circuit	GE	→ --Good Evening	MA	→ --Mill amperes
CL	→ --I am closing my station; Call	GESS	→ --Guess	MGR	→ --Manager
CLBK	→ --Callbook	GG	→ --Going	MI	→ --My
CLD	→ --Called	GLD	→ --Glad	MILL	→ --Typewriter
CLG	→ --Calling	GM	→ --Good morning	MILS	→ --Mill amperes
CMG	→ --Coming	GN	→ --Good night	MNI	→ --Many
CNT	→ --Can't	GND	→ --Ground		
CONDX	→ --Conditions	GP	→ --Ground Plane		
CPI	→ --Copy				

Table 19 CW Abbreviations.

MOM	→	->Moment
MSG	→	->Message; Prefix to radiogram
MULT	→	->Multiplier
<b>N</b>		
N	→	->No, Negative, Incorrect, No More
N	→	->Nine (as in Signal Report)
NCS	→	->Net Control Station
ND	→	->Nothing Doing
NIL	→	->Nothing; I have nothing for you;
	→	->Not In Log
NM	→	->No more
NR	→	->Number, Near
NW	→	->Now; I resume transmission
<b>O</b>		
OB	→	->Old boy
OC	→	->Old chap
OK	→	->Correct
OM	→	->Old man
OP	→	->Operator
OPR	→	->Operator
OT	→	->Old timer; Old top
OW	→	->Old Woman
<b>P</b>		
PBL	→	->Preamble
PKG	→	->Package
PSE	→	->Please
PT	→	->Point
PWR	→	->Power
PX	→	->Press, Prefix
<b>R</b>		
R	→	->Received as transmitted
RC	→	->Rag chew
RCD	→	->Received
RCVR	→	->Receiver
RE	→	->Concerning; Regarding
REF	→	->Refer to; Referring to; Reference
RFI	→	->Radio frequency interference
RIG	→	->Station equipment
ROTFL	→	->Rolling on the floor laughing
RPT	→	->Repeat, Report
RTTY	→	->Radio teletype
RST	→	->Readability, strength, tone
RX	→	->Receive, Receiver
<b>S</b>		
SA	→	->Say
SASE	→	->Self-addressed, stamped envelope
SED	→	->Said
SAE	→	->Self-Addressed Envelope
SEZ	→	->Says
SGD	→	->Signed
SHUD	→	->Should
SIG	→	->Signature; Signal
SINE	→	->Operator's personal initials or
	→	->nickname
SK	→	->Out; clear, end of contact;
	→	->no reply expected (Silent Key)
SKED	→	->Schedule
SN	→	->Soon
SP	→	->Short Path
SRI	→	->Sorry
SS	→	->Sweepstakes
SSB	→	->Single Side Band
STN	→	->Station
SUM	→	->Some
SVC	→	->Service; Prefix to service message
SWL	→	->Short Wave Listener
/ST	→	->Short timer on check in
<b>T</b>		
T	→	->Zero (with numbers)
TEMP	→	->Temperature
TEST	→	->Testing or Contest
TFC	→	->Traffic
TIA	→	->Thanks In Advance
TMW	→	->Tomorrow
TKS	→	->Thanks
TNX	→	->Thanks
TR	→	->Transmit
T/R	→	->Transmit/Receive
TRBL	→	->Trouble
TRIX	→	->Tricks
TRX	→	->Transceiver
TT	→	->That
TTS	→	->That is
TU	→	->Thank you
TVI	→	->Television interference
TX	→	->Transmitter; Transmit
TXT	→	->Text
<b>U</b>		
U	→	->You
UFB	→	->Ultra Fine Business
UNLIS	→	->Unlicensed
UR	→	->Your; You're
URL	→	->Universal Resource Locator
	→	->Address for a Webpage
URS	→	->Yours
<b>V</b>		
VE	→	->Understood (VE)
VERT	→	->Vertical
VFB	→	->Very fine business
VFO	→	->Variable Frequency Oscillator
VY	→	->Very
<b>W</b>		
W	→	->Watts
WA	→	->Word after
WATSA	→	->What Say
WB	→	->Word before
WD	→	->Word
WDS	→	->Words
WID	→	->With
WKD	→	->Worked
WKG	→	->Working
WL	→	->Well; Will
WPM	→	->Words Per Minute
WRD	→	->Word
WRK	→	->Work
WUD	→	->Would
WW	→	->Would
WX	→	->Weather
<b>X</b>		
XCVR	→	->Transceiver
XMAS	→	->Christmas
XMTR	→	->Transmitter
XTAL	→	->Crystal
XYL	→	->Wife
<b>Y</b>		
YF	→	->Wife
YL	→	->Young lady
YR	→	->Year
<b>Z</b>		
Z	→	->Zulu Time
30	→	->I have no more to send
33	→	->Fondest Regards
55	→	->Best Success
73	→	->Best Regards (NOT 73's)
88	→	->Love and kisses (NOT 88'S)
161	→	->73+88=161 "Best regards to you
	→	->and your XYL"
?	→	->question.....Section Break (Continuous).....

**Q-Codes**

<b>International Q Signals</b> .....Section Break (Continuous).....	
A Q signal followed by <u>a</u> ? asks a question. ¶	
A Q signal without <u>the</u> ? answers the question affirmatively, unless otherwise indicated. ¶	
.....Section Break (Continuous).....	
<b>QRA</b> → What is the name of your station?¶	<b>QSG</b> → Shall I send _____ messages at a time?¶
<b>QRG</b> → What's my exact frequency?¶	<b>QSK</b> → Can you work break-in?¶
<b>QRH</b> → Does my frequency vary?¶	<b>QSL</b> → Can you acknowledge receipt?¶
<b>QRI</b> → How is my tone? (1-3)¶	<b>QSM</b> → Shall I repeat the last message sent?¶
<b>QRK</b> → What is my signal intelligibility? (1-5)¶	<b>QSO</b> → Can you communicate with _____ direct?¶
<b>QRL</b> → Are you busy?¶	<b>QSP</b> → Will you relay to _____?¶
<b>QRM</b> → Is my transmission being interfered with?¶	<b>QSV</b> → Shall I send a series of V's?¶
<b>QRN</b> → Are you troubled by static?¶	<b>QSW</b> → Will you transmit on _____?¶
<b>QRO</b> → Shall I increase transmitter power?¶	<b>QSX</b> → Will you listen for _____ on _____?¶
<b>QRP</b> → Shall I decrease transmitter power?¶	<b>QSY</b> → Shall I change frequency?¶
<b>QRQ</b> → Shall I send faster?¶	<b>QSZ</b> → Shall I send each word/group more than once?¶
<b>QRS</b> → Shall I send slower?¶	→ (Answer, send twice or _____)¶
<b>QRT</b> → Shall I stop sending?¶	<b>QTA</b> → Shall I cancel number _____?¶
<b>QRU</b> → Have you anything for me? (Answer in negative)¶	<b>QTB</b> → Do you agree with my word count? (Answer negative)¶
<b>QRV</b> → Are you ready?¶	<b>QTC</b> → How many messages have you to send?¶
<b>QRW</b> → Shall I tell _____ you're calling him?¶	<b>QTH</b> → What is your location?¶
<b>QRX</b> → When will you call again?¶	<b>QTR</b> → What is your time?¶
<b>QRZ</b> → Who is calling me?¶	<b>QTV</b> → Shall I stand guard for you _____?¶
<b>QSA</b> → What is my signal strength? (1-5)¶	<b>QTX</b> → Will you keep your station open for further → communication with me?¶
<b>QSB</b> → Are my signals fading?¶	<b>QUA</b> → Have <u>you</u> news of _____?.....Section Break (Continuous).....
<b>QSD</b> → Is my keying defective?¶	

Table 20 Q-Codes (Q-Signals).

<b>ARRL QN Signals for CW NET Use</b>	
<p>The QN signals listed below are special ARRL signals for use in amateur cw nets only. They are not for use in casual amateur conversation. Other meanings that may be used in other services do not apply. <u>Do not use QN signals on phone nets. Say it with words.</u> QN signals need not be followed by a question mark, even though the meaning may be interrogatory.</p>	
Section Break (Continuous)	
<b>QNA*</b> → Answer in prearranged order.	<b>QNP</b> → Unable to copy you. Unable to copy _____
<b>QNB*</b> → Act as relay between _____ and _____	<b>QNQ*</b> → Move to <u>frequency</u> _____ and wait for _____ to _____ → finish handling traffic. Then send him traffic for _____
<b>QNC</b> → All net stations Copy. ...I have a message for all net stations.	<b>QNR</b> → Answer _____ and Receive traffic.
<b>QND*</b> → Net is Directed (controlled by net control station).	<b>QNS*</b> → Following Stations are in the net. *(Follow with list.) → Request a list of stations in the net.
<b>QNE*</b> → Entire net stand by.	<b>QNT</b> → I request permission to leave the net for _____ minutes.
<b>QNF</b> → Net is Free (not controlled).	<b>QNU*</b> → The net has traffic for you. Stand by.
<b>QNG</b> → Take over as net control station.	<b>QNV*</b> → Establish contact with _____ on this frequency. If successful, move to frequency _____ and send him traffic for _____
<b>QNH</b> → Your net frequency is High.	<b>QNW</b> → How do I route messages for _____?
<b>QNI</b> → Net stations report In.*. ...I am reporting into the net. → (Follow with a list or traffic or QRU).	<b>QNX</b> → You are excused from the net. → * Request to be excused from the net.
<b>QNJ</b> → Can you copy me? → Can you copy _____?	<b>QNY*</b> → Shift to another frequency _____ → (or to _____ kHz) to clear traffic with _____
<b>QNK*</b> → Transmit message for _____ to _____	<b>QNZ</b> → Zero beat your signal with mine. → I will zero beat my signal with yours. ....
<b>QNL</b> → Your net frequency is Low.	Section Break (Continuous)
<b>QNM*</b> → You are QRMing the net. ...Stand by.	
<b>QNN</b> → Net control station is _____, → What station has net control?	
<b>QNO</b> → Station is leaving the net.	
Section Break (Continuous)	
<b>* For use only by the Net Control Station.</b>	

Table 21 QN-Codes (QN-Signals)

## ***Signal Report (Readability, Signal Strength, and Tone) (RST)***

When communicating with others the Readability, Signal Strength, and Tone (RST) report you give lets the other party know how their signal is being received by you. The tone signal report is only used with CW communications. It serves no purpose in voice or digital modes.

It is a common practice in contests to send a generic signal report of 599 or 5NN to keep things simple and let you focus on the contest and making contacts.

UR RST 579

*Table 22 Use cut numbers 5NN instead of 599 during a contest.*

- Readability (1-5)
- Signal Strength (1-9)
- Tone (1-9, plus C, K)
  - C = Chirpy or Unstable
  - K = Key Clicks

***Cut numbers – 5NN instead of 599***

*Table 23 Signal Report (Readability, Signal Strength, and Tone) (RST)*

## How to make a short CW contact

*Ken AC5EZ*

*If you call CQ, the calling sequence looks like this:*

`CQ CQ CQ DE [your callsign] [your callsign] K`

*A station answers your CQ call:*

`[your callsign] [your callsign] DE [his/her callsign] [his/her callsign] K`

*You respond:*

`[his/her callsign] DE [your callsign]`

`TNX FER CALL UR RST [your rpt] [your rpt]`

`NAME [your name] [your name]`

`QTH [your QTH] [your QTH]`

`HW CPY? [his/her callsign] DE [your callsign] K`

*The other station responds:*

`[your callsign] DE [his callsign]`

`TNX [your name or call sign] UR RST [his rpt] [his rpt]`

`NAME IS [his name] [his name]`

`QTH [his QTH] [his/her QTH]`

`HW CPY? [your callsign] DE [his/her callsign] K`

*You have an option to “say goodbye” or continue the QSO (on the next page)*

***Closing the QSO “saying goodbye”***

[his/her callsign] DE [your callsign]  
 TNX [his/name name] VY NICE TO MEET U  
 73 ES CUL SK  
 [his/name callsign] DE [your callsign] K

***The other station might say:***

[your callsign] DE [his/her callsign]  
 TNX [your name] FOR QSO  
 73 [your callsign] DE [his/her callsign]  
 E E

***And you may respond:***

E E

***Continuing the QSO******You can continue the QSO with the following:***

[his callsign] DE [your callsign]

***Then you can respond with any or all of these lines:***

Solid copy [his name] rig here is [your transceiver]  
 ANT is [your antenna] up [how high]  
 WX here is [temperature] deg F and [weather condition]  
 HW CPY? [his/her callsign] DE [your callsign] K

***The other station might respond with his information:***

***When you're finished ready to close the QSO go back to “Closing the QSO” above.***

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