

Morse Code 101

Introduction to Morse Code



Estes Valley Amateur Radio Club

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- First It's MORSE CODE
 - NOT *MORRIS* CODE

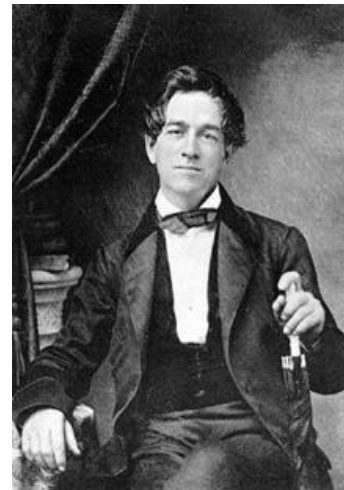


- Morris is a cat

- Samuel Fineley Breese **Morse** is given credit as the inventor of the telegraph and the code



- Alfred Vail was his Assistant:



What we will cover

- Learning Morse Code
- Sending Morse Code
- A 'standard' QSO
- Some Misc items

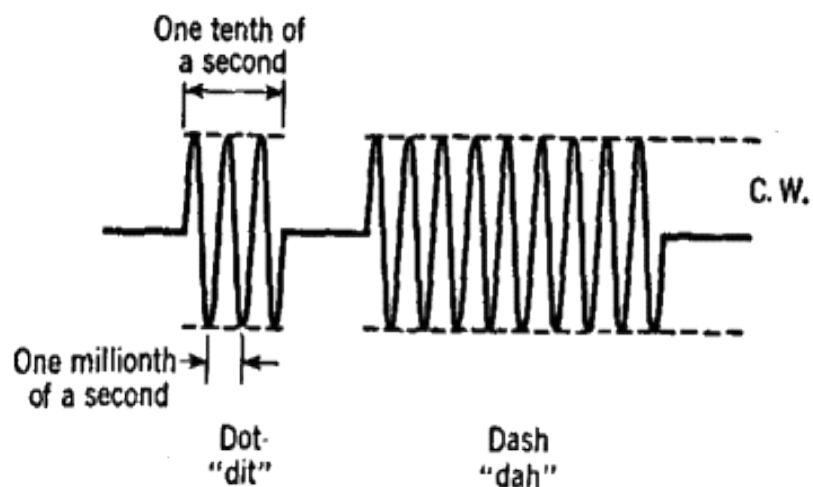
- **My Amateur Radio History**

- First Licensed as a Novice in 1964, when I was 15 years old –
KN7YXO
 - That required a 5 wpm code test
- I upgraded to General Class in 1965 - WA7COH
 - That required a 13 wpm code test from the FCC

- There are actually two Morse codes!
 - American Morse
 - International (Continental) Morse code

- Am I learning Morse Code or CW?

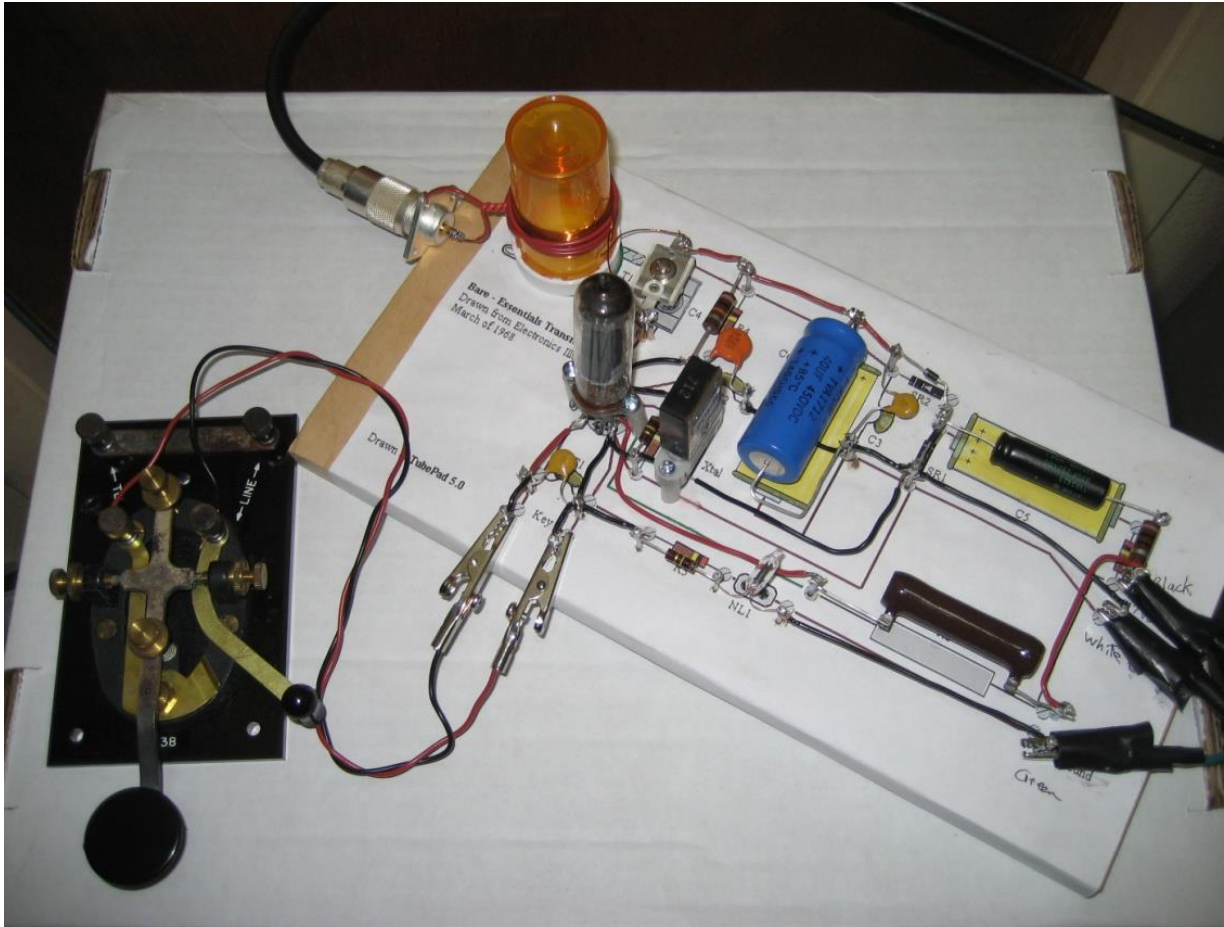
CW – Continuous Wave



- Why Morse Code?
 - Why not Phone?
 - Effective
 - Efficient
 - Universal
 - Simple!

- It's Simple!

- You can build a CW transmitter with just 17 parts!



- Why else use Morse Code?
 - **More Frequencies**
 - **Low profile or Stealth operation**
 - Backpacking and Hiking
 - It's **FUN**
 - **Hearing Impairments**
 - You will be **special!**

- Learning the code
 - The Right way
 - Learning by sound from the start
 - The Wrong way
 - Learning visually by memorizing a code table

- Learning the code
 - **BIG MISTAKE** – memorizing a code table

Character	Morse Code	Character	Morse Code	Number	Morse Code
A	• -	N	- •	1	• - - - -
B	- • • •	O	- - -	2	• • - - -
C	- - • •	P	• - - •	3	• • • - -
D	- • •	Q	- - • -	4	• • • • -
E	•	R	• • •	5	• • • • •
F	• • • •	S	• • •	6	- • • • •
G	- - - •	T	-	7	- - - • •
H	• • • •	U	• • -	8	- - - • • •
I	• •	V	• • • -	9	- - - • • • •
J	• - - - -	W	• • - -	0	- - - - -
K	- • - -	X	- - • •		
L	• • • •	Y	- - - -		
M	- -	Z	- • • •		

- Best Way to Learn – Aurally (dits & dahs)
 - Learn it by SOUND
- **NEVER** Dots and Dashes and visually
- Practice both sending and receiving at the same time.

- **Methods:**

- Recordings
- Computer programs
- On the air code practice

- What do you need to learn?
 - The Alphabet (A to Z)
 - The numbers (0 to 9)
 - Punctuation . , / ? =
 - Prosigns
 - AR, AS, SK, CL, K, KN, error
 - **Only 48 symbols!**

- What order to learn them in?
 - It really doesn't matter

Learn Code the EASY Way

Beginners, Amateurs and Experts alike recommend the INSTRUCTOGRAPH, to learn code and increase speed.

MACHINES FOR RENT OR SALE

Learning the INSTRUCTOGRAPH way will give you a decided advantage in qualifying for Amateur or Commercial examinations, and to increase your words per minute to the standard of an expert. The Government uses a machine in giving examinations.

Motor with adjustable speed and spacing of characters on tapes permit a speed range of from 3 to 40 words per minute. A large variety of tapes are available — elementary, words, messages, plain language and coded groups. Also an "Airways" series for those interested in Aviation.

MAY BE PURCHASED OR RENTED

The INSTRUCTOGRAPH is made in several models to suit your purse and all may be purchased on convenient monthly payments if desired. These machines may also be rented on very reasonable terms and if when renting you should decide to buy the equipment the first three months rental may be applied in full on the purchase price.

ACQUIRING THE CODE

It is a well-known fact that practice and practice alone constitutes ninety per cent of the entire effort necessary to "Acquire the Code," or, in other words, learn telegraphy either wire or wireless. The Instructograph supplies this ninety per cent. It takes the place of an expert operator in teaching the student. It will send slowly at first, and gradually faster and faster, until one is just naturally copying the fastest sending without conscious effort.

BOOK OF INSTRUCTIONS

Other than the practice afforded by the Instructograph, all that is required is well directed practice instruction, and that is just what the Instructograph's "Book of Instructions" does. It supplies the remaining ten per cent necessary to acquire the code. It directs one how to practice to the best advantage, and how to take advantage of the few "short cuts" known to experienced operators, that so materially assists in acquiring the code in the quickest possible time. Therefore, the Instructograph, the tapes, and the book of instructions is everything needed to acquire the code as well as it is possible to acquire it.



The Instructograph

ACCOMPLISHES THESE PURPOSES:

FIRST: *It teaches you to receive telegraph symbols, words and messages.*

SECOND: *It teaches you to send perfectly.*

THIRD: *It increases your speed of sending and receiving after you have learned the code.*

With the Instructograph it is not necessary to impose on your friends. It is always ready and waiting for you. You are also free from Q.R.M. experienced in listening through your receiver. This machine is just as valuable to the licensed amateur for increasing his speed as to the beginner who wishes to obtain his amateur license.

Postal Card WILL BRING FULL PARTICULARS IMMEDIATELY

THE INSTRUCTOGRAPH CO.

4707 SHERIDAN ROAD
4700 S. CRENSHAW BLVD.

CHICAGO, ILLINOIS 60640
LOS ANGELES, CALIFORNIA 90043

From the Instructograph Manual (1931):

Factors in learning Morse Code:

Natural Ability 5%

Psychology 10%

Study and Practice 85%

From the Instructograph Manual (1931)

VITAL FACTORS of PRACTICE AND STUDY:

1. Psychological Attitude
2. Regularity of Practice
3. Timing of Characters
4. Persistency

Have a positive mental attitude:

“It is easy for me to learn code; I am doing it now”

“Zen and the Art of Radiotelegraphy”

- Carlo Consoli, IK0YGG

Relaxation Exercise to do before you start

- Learning

- Recordings – Records, CD's, cassette tapes:



- Learning

- **Recordings** – CD's, MP3 files

- K7QO's Fists Code Course (50 free today!)

- ARRL

- W5YI

- VIS Amateur Supply – KB6MT

- High Speed QSO training

- Learning
 - Computer programs
 - G4FON (Koch method)
 - Just Learn Morse

 - There's an App for that!

- Learning – On the Air
 - W1AW code practice
 - Slow code at 5, 7-1/2, 10, 13, 15 wpm
 - Fast code at 35, 30, 25, 20, 15, 13, 10 wpm
 - Also available as mp3 download

- Learning – On the Air
 - Use of CW Filters / DSP (Selectivity)
 - Wide ~ 2200-2500 Hz (often SSB filter)
 - Use a Narrow filter ~ 500 Hz
 - Use Headphones (ear phones, ear buds)

- Learning – On the Air

- Read your manual!

- i.e. AGC-F should be in on an FT-840
 - Know how to use reverse CW sideband
 - Know how to change your sidetone pitch
 - An automatic DSP notch filter can remove the desired signal at the same time as it removes interfering signals

- Learning – On the Air
 - CW Ops Club www.cwops.org
 - CW Academy - (3x a year; 8 weeks)
 - Training is online (Skype) and on the air
 - Three levels:
 - Beginners < 10 wpm
 - Intermediate 11 – 15 wpm
 - Advanced 16 - 20 wpm

- How long will this take?

Receiving Speed attained (wpm)	Approximate Learning Time
5 wpm	30 hours
10 wpm	60 hours
15 wpm	95 hours
20 wpm	150 hours

- Best to do *daily* short practice sessions
 - No more than thirty minutes daily
 - Two fifteen minute sessions daily best
- More frequent practice sessions are better
- Repetition, Repetition, Repetition
- Writing in script is 50% faster than printing
- If you miss a letter, let it go. Leave a space.
 - Otherwise you will miss the next 4 or 5 characters.

- Your goal is instance recognition.
- RELAX! Take a deep breath.
- If you are missing letters, struggling, etc.
 - Take a break! This is a hobby, not a job!
- If you hit a plateau, just keep practicing.
 - Some days you won't copy as fast as you previously did
 - But at few days later you will be through the plateau
- Remember, we are amateurs, not professionals!

- Copying code is a sub-conscious mental process.
- There really isn't a way to 'learn sub-consciously', other than practice.

- Farnsworth method (aka Farnsworth spacing)
 - The letters are sent at a higher wpm,
 - But the space between them is longer to make the overall speed slower.
 - Always use the Farnsworth method, or you will need to learn the code 3 or 4 times!

• Koch Method

- Traditionally, Morse code has been taught by struggling through all the codes at a slow speed and then (slowly) progressing toward higher speeds.
- Koch's method was invented by German psychologist Ludwig Koch in the 1930s.
- Koch's method, on the other hand, dictates that you should start learning at the desired speed - but you start with only two characters. Each session is five minutes long, and whenever you get 90% or more correct, you add another character.
- G4FON & Just Learn Morse utilizes Koch's method for teaching Morse code.

TIPS You May Hear From Hams:

- You have to push yourself hard.
- Don't push yourself too hard, you'll burn out.
- Use Code CD's.
- Don't use code CD's, use a computer program
- Listen to CD's in the car
- Don't listen to CD's in the car, it's dangerous!

TIPS You May Hear From Hams:

- Never look at a chart when you practice.
- Look at the chart to help you remember
- Learn the code in groups of related sounds
- Learn the most frequently used letters first
- Try to copy code off the air
- Don't try to copy code off the air

BEST TIPS on learning:

So different methods work for different people.

Try different ones to see what you like.

Sometimes a change in approach helps create variety.

BEST TIPS on learning:

Give extra attention to P, Y, J, Z, X, Q, and L

They are not so frequently used as the rest of the alphabet.

Printing or Writing copy?

You can print your copy up to about 10wpm;

Handwriting work up to about 30wpm,

Then use a keyboard or typewriter (Mill) for higher speeds.

Your Plan of Attack!

1. Start with the CD
2. If you wish, use a computer program
3. Then move to on the air copying

SENDING MORSE CODE

- **Spacing** or **Timing** – VERY IMPORTANT if anyone is going to copy you!
 - A Dit is the basic element everything is measured with.
 - A Dah is the length of **3** dits.
 - The space between code elements is **1** dit.
 - The space between code characters (letters) is **3** dits.
 - The space between words is **7** dits.
- **Listening to properly sent code is the best way to learn the correct spacing**

Terms

- **FIST** – Your distinctive rhythm when sending with a straight key.
- **LID** – A poor operator – has a POOR FIST, and poor operating procedures.
- **Ham** – Ham fisted? Due to poor sending?

- Learning to Send Morse Code
 - Code Practice Oscillator (CPO)
 - Straight key
 - or
 - Paddle
- Forget trying to use a ‘bug’, or a semi-automatic key at this point.

- Sending Morse Code
 - Code Practice Oscillator (CPO)



- Sending Morse Code – Straight Key



- Your goal is Accuracy, Beauty, Speed.
 - Just in that order

- The motto of the FISTS telegraph club is
 - “Accuracy transcends Speed”

– Practice sending using Panagrams

- The quick brown fox jumps over the lazy dog. (35 letters)
- While making deep excavations we found some quaint bronze jewelry. (56 letters)

- **Adjusting and using a Straight Key**

- Spacing
- Spring tension
- Sit upright with your arm inline with the key
- The knob should be about 18 inches from the table edge
- Use a relaxed grip

- **The wrong way!**



The NIBBLER



The HITCH HIKER



The CLUTCHER



The JITTER



The POUNDER



The SLAPPER



The TEA DRINKER

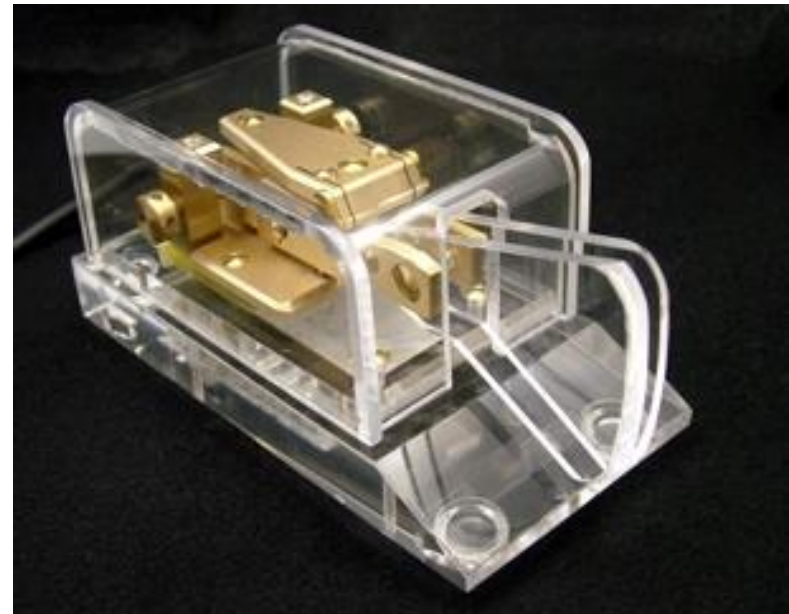


The TAPPER

- **Single Lever Paddle GH-GF501A**



- **Double Lever Paddle**



- Sending Morse Code

- Keyer -

- Speed with a Keyer is can be up to 60 wpm.



- Sending Morse Code

- Keyer - Modes:

- Standard

- Iambic

- Iambic Mode A

- Iambic Mode B

- Ultimatic

- Bug Mode

- **Iambic keying**

- Has nothing to do with the paddle! It has to do with the Keyer.
- However, Iambic sending requires a dual-lever paddle.

- Sending Morse Code
 - Keyer
 - **Standard** – Series of Dit's to the Right
Series of Dah's to the Left

Uses a **single or double** paddle

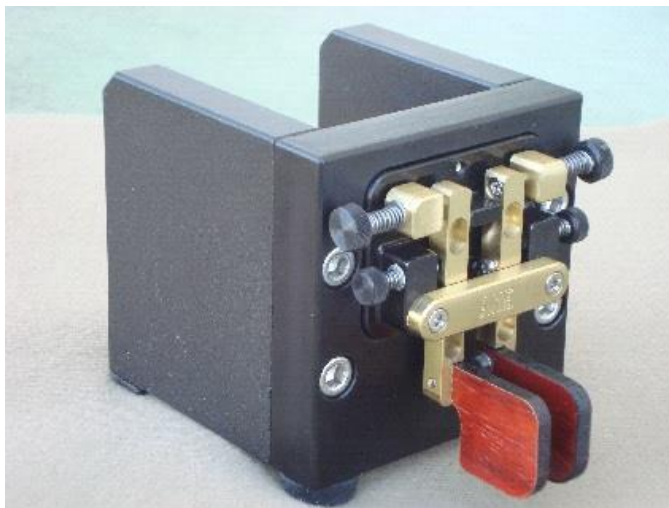


- Sending Morse Code

- Keyer

- Iambic - Uses a Double Paddle – Squeeze keying

- **Iambic Mode A** – Checks for paddle inputs after the end of each dit or dah.



- Sending Morse Code

- Keyer

- Iambic - Uses a Double Paddle – Squeeze keying

- **Iambic Mode B** – Checks for paddle input during each dit or dah



- Sending Morse Code

- Keyer

- Ultimatic – Will send dits and dahs according to the last paddle to be pressed.

- Now that you can send and receive, let's get on the air!
 - Side Tone from your Transceiver

 - ZERO BEAT aka SPOTTING

 - RIT – Receiver Incremental Tuning

- **Q Signals –**

- To speed up the QSO;
- To overcome language differences

- **Q Signals** – create question by adding ‘?’

- QTH - Location
- QRL - I am busy
- QRM - I am being interfered with (hint: **Man Made**)
- QRN - I am troubled by Static (hint: **Natural**)
- QRP - Reduce power / QRO increase power
- QRS - Send slower / QRQ Send faster
- QRT - Stop sending / Quit
- QSY - Change frequency
- QSB - My signals are fading

• **Abbreviations**

– Common ones used in QSO

- R – received
- FER – for
- TNX – Thanks
- WX – weather
- 73 – Best regards
- EEEEEEEEE – error

GM – Good Morning

HW? – How copy?

BTU – Back to you

CUL – See you later

88 – Love and Kisses

C – Correct / Yes

- **Prosigns** - (procedure signals) Sent as one character
 - CQ – general to call to anyone
 - DE – From/this is (i.e. KB0WVH de WB0IXV)
 - K – Go ahead and transmit / Over
 - KN – same as K, but for specific station
 - AR – End of message
 - AS – Wait / Stand by
 - SK – End of transmission / QSO / Clear
 - CL – Closing station / Going off the air
 - BT or ‘=’ to separate thoughts / like period
 - SOS – Emergency Signal

- **RST**
 - 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

- **QRL? (is this frequency in use?)**
- **CQ CQ CQ DE WB0IXV WB0IXV K (repeat up to 3 times)**
- **WB0IXV WB0IXV DE N6UA N6UA KN**
- **QRZ? – WHO IS CALLING ME**

- N6UA DE WB0IXV R = GM (GA, GE) TNX FER CALL = UR
RST 599 599 = QTH ESTES PARK, CO. ESTES PARK,
CO. = NAME IS DAVE DAVE = HW? AR N6UA DE
WB0IXV KN
- WB0IXV DE N6UA R = GM (GA, GE) DAVE TNX FER CALL =
UR RST 578 578 = QTH LOGAN UTAH LOGAN UTAH =
NAME DOUG DOUG = HW? AR WB0IXV DE N6UA KN

- **N6UA DE WB0IXV R = TNX DOUG FOR (NICE) RPT = MY RIG IS A YAESU FT840 ANT IS A WINDOM = HW? AR N6UA DE WB0IXV KN**
- **WB0IXV DE N6UA R = RIG HR IS KENWOOD ANT IS DIPOLE LAYING ON ROOF = BK TO U = WB0IXV DE N6UA KN**
- **N6UA DE WB0IXV R = UR RIG IS DOING GOOD JOB HERE = YOU HAVE FB SIG = WX IS COLD TEMP IS 35 = HW? AR N6UA DE WB0IXV KN**

- WB0IXV DE N6UA R = ITS COLD HR IN UTAH TOO = TEMP IS 15 = BK TO U = WB0IXV DE N6UA KN
- **N6UA DE WB0IXV R = OK TNX DOUG FOR REAL FB QSO = HPE CU AGN = (GUD LUCK) VY 73 GM (GA GN) SK N6UA DE WB0IXV K (CL)**
- WB0IXV DE N6UA R = 73 DAVE TNX FER QSO = WB0IXV DE N6UA K

- QSO Resources:

- www.fistsna.org

- Operating / Op Aids / Basic CW Operating Manual

- www.skccgroup.com

- CW Beginners Corner

- QSK - Full Break In

IMPORTANT:

- Only send as fast as you can receive!
- Only send as fast as the other operator is sending
- Ask them to slow down, **QRS 10 PSE**, if needed!
- When selecting an operating frequency, separate yourself 150 to 500 Hz from other stations.

Groups with slow speed (QRS) code operators:

FISTS – The International Morse Preservation Society

7.028, 7.048, 7.118 10.118, 14.058, 21.058,
21.185, and others

SKCC – Straight Key Century Club

7.055, 7.120, 10.120, 14.050, 21.050, and others



ILLINOIS SKcc 14848
 KNOX COUNTY FLJTS 17586
N90AT
 CONFIRMING QSO WITH
 DATE MONTH YEAR UTC
 13 16 0210
 WBØIXV 3 8 14 0015 70
 MICHAEL L. COPAS
 TXN HQ QSO

SK & CC
 #7239
N08C
 Putman County - EN71
 Michael L. Copas
 109 E. Main Cross
 P.O. Box 66
 Miller City, Ohio 45864
 mike.copas@gmail.com
 Pse QSL Tax
 RST 599 MODE CW
 www.cheapads.com

ESTES PARK, COLORADO
 Larimer County
WBØIXV
 David O'Farrell
 1240 Tall Pines Drive
 Estes Park, CO 80517

N6UA
 N6UA

6FFT
PHIL GEYER
 P.O. Box 245
 Alpine, CA 91903 U.S.A.
 DATE MONTH YEAR UTC
 25 JULY 2015 0300
 WBØIXV 7.114 579 CW
 The OSL MAIN® - WAMPY

Contesting

CQ TEST CQ TEST

DX'ing

- Working Split
- Don't work too close to the band edge.

Morse Code 101

- Contact info:
 - WBØIXV@arrrl.net
 - 970.577.7372
- Resources:
 - See handout
 - Morse Express
10691 E Bethany Dr, Suite 800
Aurora, CO 80014 USA

