eMail
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Ogden Amateur Radio Club

W7SU

PO Box 3353 Ogden UT 84409

YAHOO! Groups Join Now! Join to receive club email

To Print Web Page - 1st click anywhere on right panel/frame

NEXT CLUB MEETING/ACTIVITY

Meeting: HF-101 Presentation
by Val Campbell K7HCP

Date: 3rd Saturday 17 October 2015
Time: 9:00 AM
Location: Riverdale Fire Station MAP

HF-101 "What you might be missing in Ham Radio"

HF-101 is not a training course. It is intended to generate interest and desire in operating in the HF bands and all the many other activities that goes along with having a General Class license.

It complements the experience that some may have had at Field Day or Golden Spike and will inspire initiative to those who have not otherwise moved beyond their VHF/UHF experience.

"WATTS NEWS" e-Magazine

Latest Edition

September 2015 edition NEW! Archive
(published at least 1 week prior to club meeting/activity)

(sign up with the OARC Yahoo Group to receive publication release notices)

HF – 101 **

HF for beginners

HF – 101 *

HF for beginners

What you might be missing in Ham Radio

HF - 101

HF for beginners

What you might be missing in Ham Radio

by Val Campbell K7HCP

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HF - 101

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NOTE

This presentation is available for viewing, printing or download at:

OgdenArc.org >>> downloads

Discussion Topics

(1) History & Life Cycle

(2) The Ham Bands

(3) Ham Radio Science

(4) Operating Ham Radio

(5) Ham Radio Equipment

(6) Ham Radio Tools & Aids

(1a) Radio History

HISTORY *

Rich History of Wireless Communications

- 1901- Marconi accomplished the first Trans-Atlantic radio communication
- 1914 - The ARRL (American Radio Relay League) was formed
- 1921 - OARC (Ogden Amateur Radio Club) was formed … by Dr W.G. Garner - W7SU of Ogden Utah
- 1937 - OARC became an affiliated club of the ARRL
- 2015 - Celebrates 101 years of Ham Radio

HISTORY

Number of US Amateur Radio Licenses at All Time High

- *1961 = 210,000 amateur licenses in the United States*
- *1995 > AOL said "Hams" will soon become extinct … NOT*
- *2015 = 727,000 licensed amateurs*
- 2015 = 29,000 new licenses this year
- 2015 = 167,000 ARRL members

(1b) Life Cycle of a Ham

You got your Technicians Class Amateur Radio Operators License

Then …

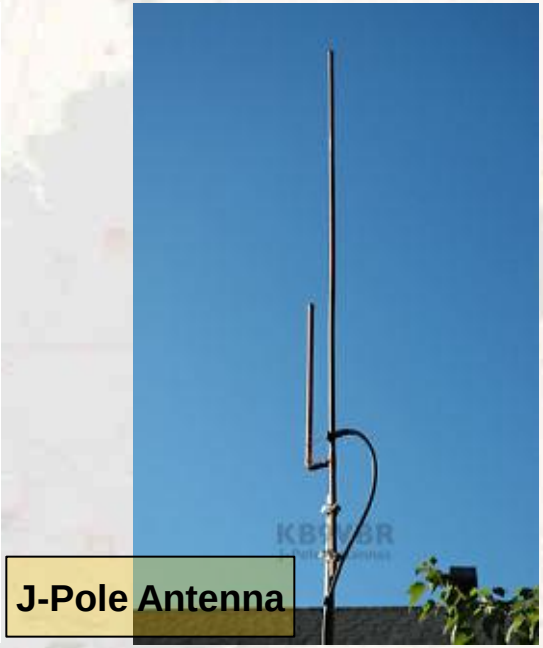
Handy Talkie

Handy Talkie

Rubber Duckie Antenna

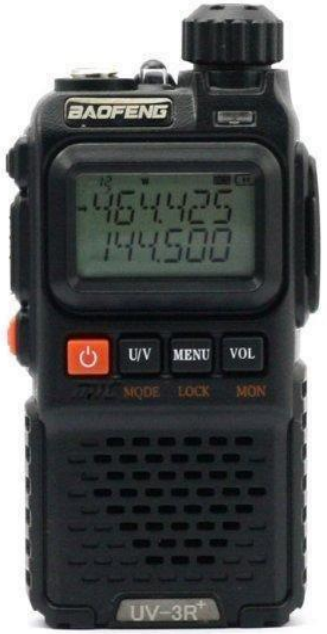
Handy Talkie

Rubber Duckie Antenna



J-Pole Antenna

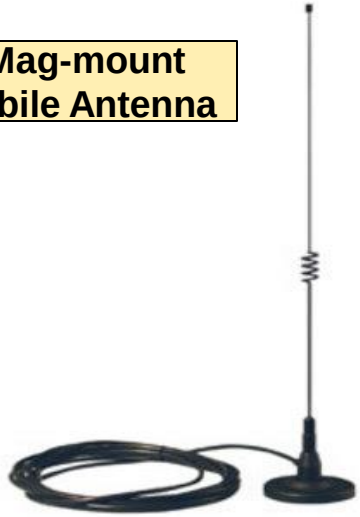
Handy Talkie



Rubber Duckie Antenna

J-Pole Antenna

Mag-mount Mobile Antenna



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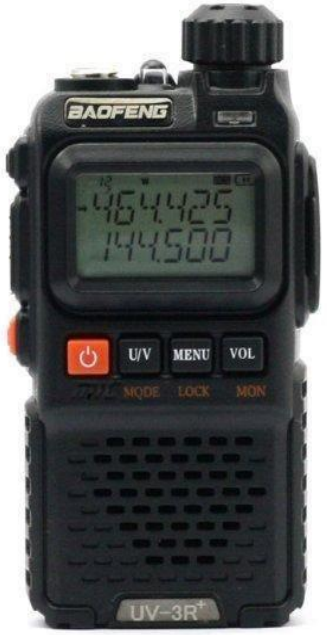

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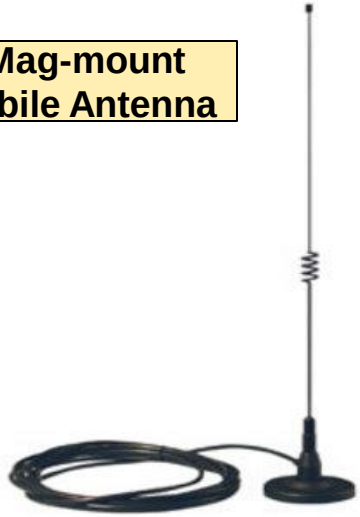
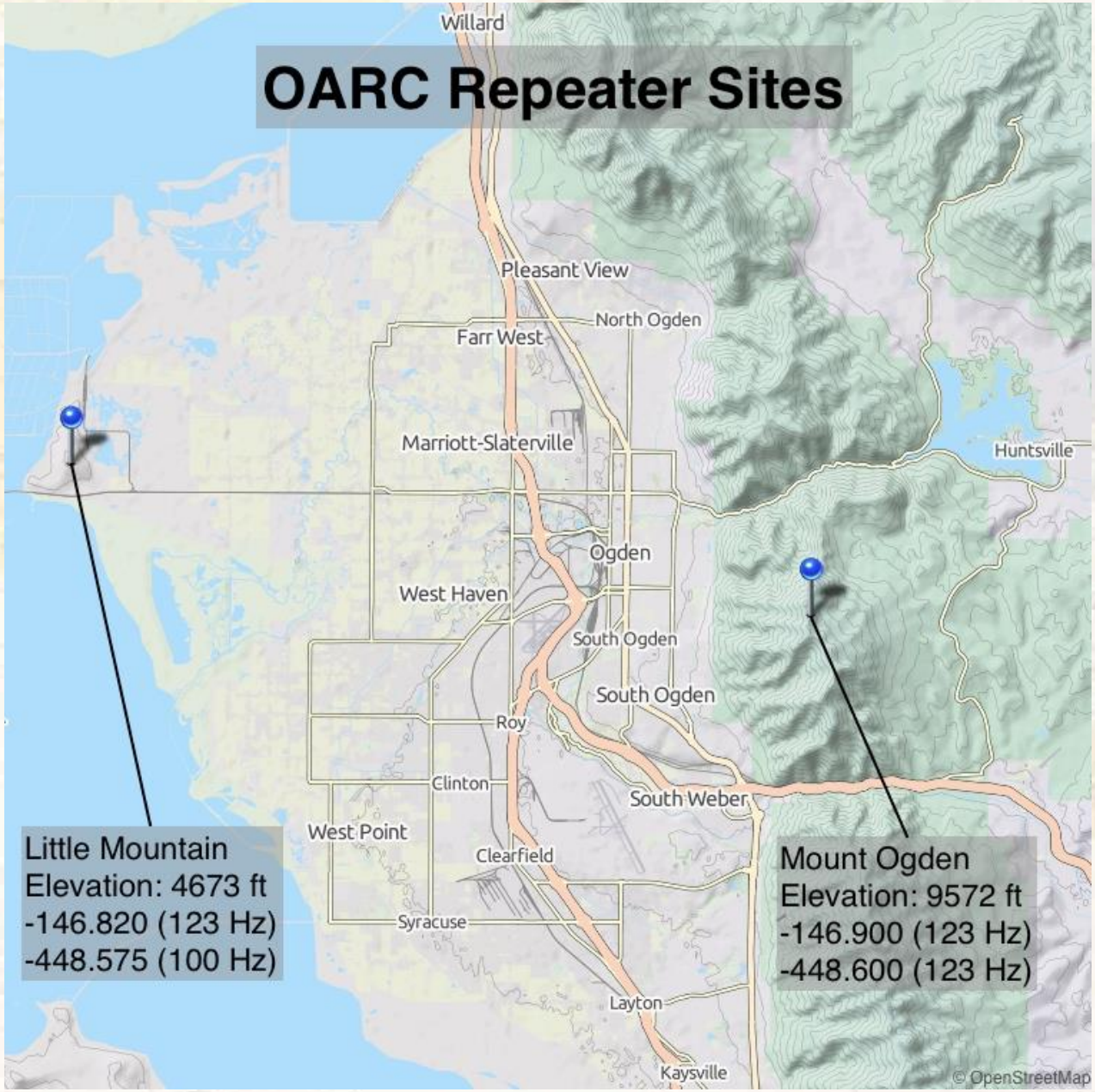


Base Station or Mobile VHF/UHF Transceiver


OARC Repeater Sites
Willard
Pleasant View
North Ogden
Farr West
Marriott-Slaterville
Huntsville
Ogden
West Haven
South Ogden
South Ogden
Roy
Clinton
South Weber
West Point
Clearfield
Syracuse
Layton
Kaysville
Little Mountain
Elevation: 4673 ft
-146.820 (123 Hz)
-448.575 (100 Hz)
Mount Ogden
Elevation: 9572 ft
-146.900 (123 Hz)
-448.600 (123 Hz)
© OpenStreetMap

Mount Ogden Repeater Site

9500+ Feet Elevation

Little Mountain Repeater Site

Totally Solar Powered

Advertisement

The Ogden Amateur Radio Club (OARC)
repeaters are installed and maintained by our club members
and are funded with your club membership
dues and donations.

Please Be Generous

Our repeaters are “open-repeaters” that are available
for ALL hams to use.

So
“Life Is Good”
but
Is There More?

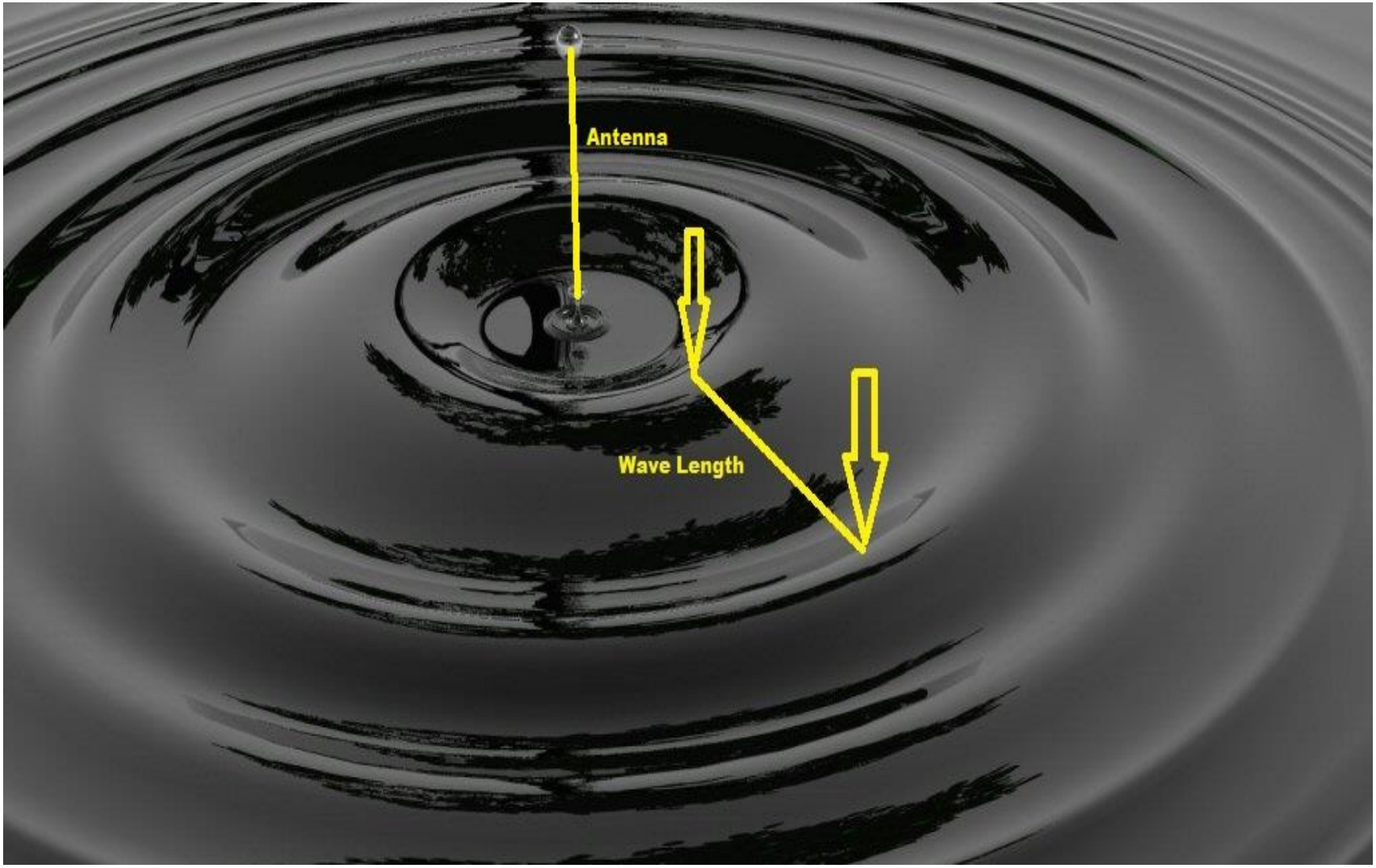
What you might be missing in Ham Radio

HF… the Short Wave Bands

This is HF's play ground

(2) The Ham Bands

Waves



Audio Sound Waves

Audio/Sound Waves *

- **Human Ears** **20 Hz - 20 KHz**
  - Monaural (30 – 3,000 Hz)
  - Stereo (30 - 10,000 Hz)

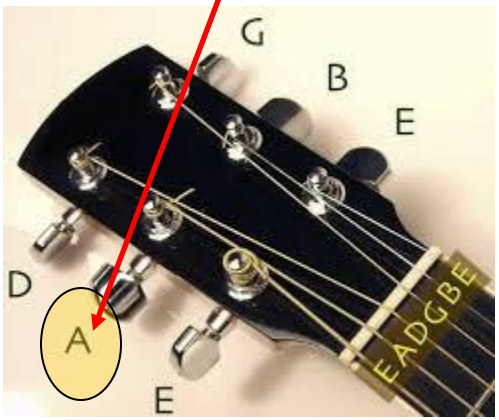
Audio/Sound Waves

- **Human Ears** **20 Hz - 20 KHz**
  - Monaural (30 – 3,000 Hz)
  - Stereo (30 - 10,000 Hz)

- **Dogs Ears** **40 Hz – 60 KHz**
  - Dog whistle (20,000 Hz)

Audio/Sound Waves

Guitar “A” string = 440 vibrations per second
= 440 Hertz (Hz)



Sound waves travel thru earths atmosphere at a speed of

MACH 1

= 720 mph

Radio Frequency Waves are

Electro/Magnetic Waves

Radio Frequency Electro/Magnetic Waves ***

- **Long Wave (ground wave only)**

Radio Frequency Electro/Magnetic Waves **

- **Long Wave (ground wave only)**
- **Medium Wave (ground wave + some skip)**

Radio Frequency Electro/Magnetic Waves *

- **Long Wave (ground wave only)**
- **Medium Wave (ground wave + some skip)**
- **Short Wave (subject to skip)**

Radio Frequency Electro/Magnetic Waves

- **Long Wave (ground wave only)**
- **Medium Wave (ground wave + some skip)**
- **Short Wave (subject to skip)**
- **Line of Sight (30 miles range)**

Radio Frequency Electro/Magnetic Waves *

- **Long Wave (ground wave only)**

ELF (Extra Low Frequency) .3 KHz - 3 KHz
VLF (Very Low Frequency) 3 KHz - 30 KHz
LF (Low Frequency) 30 KHz - 300 KHz

Non-Directional Beacons (Airports, Nautical, Time)

- 60 KHz = WWVB **Atomic Clocks** (Fort Collins CO)
- 190 – 530 KHz = Aviation Beacons
  - » 294 KHz = BMC [-… -- -.-.] (Brigham City UT Airport)
  - » 359 KHz = BO [-… ---] (Boise ID Airport)
  - » 371 KHz = TVY [- …- -.--] (**Tooele UT Airport**)

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tvy

Radio Frequency Electro/Magnetic Waves

- **Medium Wave (ground wave + some skip)**

MF (Medium Frequency) **300 KHz – 3 MHz**

» **AM Broadcast Radio** (550 KHz – 1700 KHz)

Radio Frequency Electro/Magnetic Waves *

- **Short Wave (subject to skip)**

HF (High Frequency) 3 MHz – 30 MHz

- Ham Bands (160m, 80m, 60m, 40m, 30m, 20m, 17m, 15m, 12m, 10m) [10]
- **Short Wave International Broadcast**, Citizens Band, Cordless Phones
- **HF National Bureau of Standards Time Signals**

Radio Frequency Electro/Magnetic Waves

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HF Time Signals

HF TIME SIGNALS ***

WWVB Atomic Clock Synchronizer (Fort Collins CO)

» 60 KHz Digital

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WWVB Atomic Clock Synchronizer (Fort Collins CO)

» 60 KHz Digital

WWV National Bureau of Standard (Fort Collins CO)

WWVH National Bureau of Standard (Hawaii)

» 2.5 MHz AM

» 5.0 MHz AM

» 10.0 MHz AM

» 15.0 MHz AM

» 20.0 MHz AM

HF TIME SIGNALS *

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w w v

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» 15.0 MHz AM
» 20.0 MHz AM

CHU **Canada**

» 3.300 MHz SSB
» 7.850 MHz SSB
» 14.670 MHz SSB

Line of Sight
Radio Waves

Radio Frequency Electro/Magnetic Waves **

- **Line-of-Sight**
  - **VHF (Very High Frequency) 30 MHz – 300 MHz**
    - **FM Broadcast Radio** (88 MHz – 108 MHz)
    - Ham 6 meter, 2 meter & 1.25 meter band, Analog TV, Airports

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    - Ham 70 cm, 33 cm & 23 cm band, **Digital Television**, Airports, Cell Phone, Wireless Routers

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WiFi Routers

WiFi routers

The WiFi 802.11 protocols use five distinct frequency ranges:

2.4 GHz, 3.6 GHz, 4.9 GHz, 5 GHz, and 5.9 GHz bands.

Hams share the **2.4 GHz** band with WiFi routers.

Radio Frequency Electro/Magnetic Waves *

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    - Ham 70 cm, 33 cm & 23 cm band, **Digital Television**, Airports, Cell Phone, Wireless Routers

  - **Micro Wave 3 GHz & up**
    - Land Line Telephone Communications,
    - Ham bands 2.3, 2.4, + 3.3, 5.5, 10, 24, 47, 76, 122, 134, 241, 275 (GHz) [12]
    - **Microwave Ovens = 2.45 GHz**

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    - **Microwave Ovens = 2.45 GHz**

Microwave Ovens

A microwave oven is a high power microwave transmitter

Most ovens operate at power level of 1.1 Kw

at 2450 MHz = 2.45 GHz

which is a wave length of 12.25 cm

This is the resonant frequency of the

H_2O water molecule

Radio Frequency Electro/Magnetic Waves

- **Short Wave (subject to skip)**

Now … more about… High Frequency (HF) - short wave

HF (High Frequency) 3 MHz – 30 MHz

- Ham Bands (160m, 80m, 60m, 40m, 30m, 20m, 17m, 15m, 12m, 10m) [10]
- **Short Wave International Broadcast**, Citizens Band, Cordless Phones
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HF Ham Bands

HF Ham Bands **

160 Meters	1.800 MHz – 2.000 MHz (*)
80 Meters	3.500 MHz – 4.000 MHz
40 Meters	7.000 MHz – 7.300 MHz
20 Meters	14.000 MHz – 14.350 MHz
15 Meters	21.000 MHz – 21.450 MHz
10 Meters	28.000 MHz – 29.700 MHz
6 Meters	50.0 MHz – 54.0 MHz (*)

* (not HF but sometimes included in HF Transceivers)

HF Ham Bands (warc bands) *

160 Meters	1.800 MHz – 2.000 MHz (*)
80 Meters	3.500 MHz – 4.000 MHz
40 Meters	7.000 MHz – 7.300 MHz
30 Meters	**10.100 MHz – 10.150 MHz**
20 Meters	14.000 MHz – 14.350 MHz
17 Meters	**18.068 MHz – 18.168 MHz**
15 Meters	21.000 MHz – 21.450 MHz
12 Meters	**24.890 MHz – 24.990 MHz**
10 Meters	28.000 MHz – 29.700 MHz
6 Meters	50.0 MHz – 54.0 MHz (*)

HF Ham Bands (60 meters)

160 Meters	1.800 MHz – 2.000 MHz (*)
80 Meters	3.500 MHz – 4.000 MHz
60 Meters (channels)	5.330, 5.346, 5.366, 5.371, 5.403 MHz
40 Meters	7.000 MHz – 7.300 MHz
30 Meters	10.100 MHz – 10.150 MHz
20 Meters	14.000 MHz – 14.350 MHz
17 Meters	18.068 MHz – 18.168 MHz
15 Meters	21.000 MHz – 21.450 MHz
12 Meters	24.890 MHz – 24.990 MHz
10 Meters	28.000 MHz – 29.700 MHz
6 Meters	50.0 MHz – 54.0 MHz (*)

Tech / Novice HF Bands

80 M - CW	3.525 MHz – 3.600 MHz
40 M - CW	7.025 MHz – 7.125 MHz
15 M - CW	21.025 MHz – 21.200 MHz
10 M - CW / Data (digital)	28.000 MHz – 28.300 MHz
10 M - SSB	28.300 MHz – 28.500 MHz
6 M – ALL Modes	50.0 MHz – 54.0 MHz

Band Plan Chart

ARRL Ham Band CHART ***

US Amateur Radio Bands

US AMATEUR POWER LIMITS

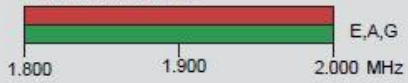
FCC 97.313 An amateur station must use the minimum transmitter power necessary to carry out the desired communications. (b) No station may transmit with a transmitter power exceeding 1.5 kW PEP.

Effective Date March 5, 2012

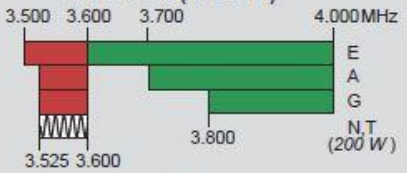
Published by:
ARRL The national association for AMATEUR RADIO®
www.arrl.org
225 Main Street, Newington, CT USA 06111-1494

160 Meters (1.8 MHz)

Avoid interference to radiolocation operations from 1.900 to 2.000 MHz



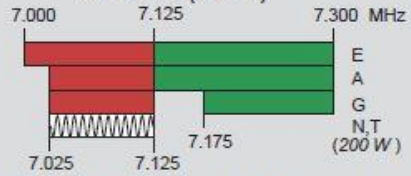
80 Meters (3.5 MHz)



60 Meters (5.3 MHz)

General, Advanced, and Amateur Extra licensees may operate on these five channels on a secondary basis with a maximum effective radiated output of 100 W PEP. Permitted operating modes include upper sideband voice (USB), CW, RTTY, PSK31 and other digital modes such as PACTOR III as defined by the FCC Report and Order of November 18, 2011. USB is limited to 2.8 kHz centered on 5332, 5348, 5358.5, 5373 and 5405 kHz. CW and digital emissions must be centered 1.5 kHz above the channel frequencies indicated above. Only one signal at a time is permitted on any channel.

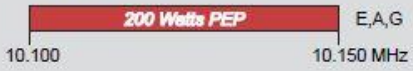
40 Meters (7 MHz)



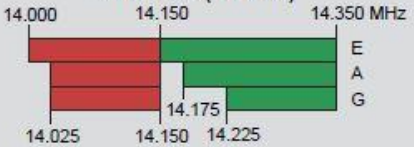
Phone and Image modes are permitted between 7.075 and 7.100 MHz for FCC licensed stations in ITU Regions 1 and 3 and by FCC licensed stations in ITU Region 2 West of 130 degrees West longitude or South of 20 degrees North latitude. See Sections 97.305(c) and 97.307(f)(11).
Novice and Technician licensees outside ITU Region 2 may use CW only between 7.025 and 7.075 MHz and between 7.100 and 7.125 MHz. 7.200 to 7.300 MHz is not available outside ITU Region 2. See Section 97.301(e). These exemptions do not apply to stations in the continental US.

30 Meters (10.1 MHz)

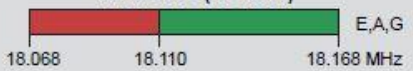
Avoid interference to fixed services outside the US.



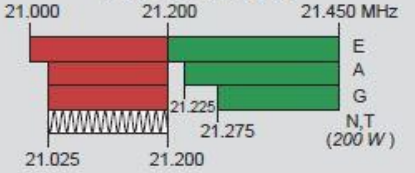
20 Meters (14 MHz)



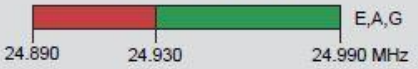
17 Meters (18 MHz)



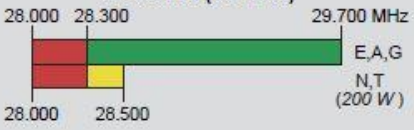
15 Meters (21 MHz)



12 Meters (24 MHz)



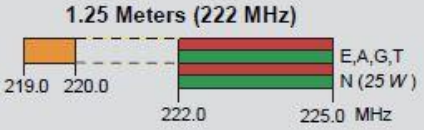
10 Meters (28 MHz)



6 Meters (50 MHz)

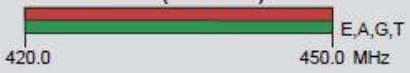
2 Meters (144 MHz)

1.25 Meters (222 MHz)

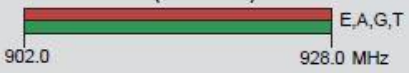


*Geographical and power restrictions may apply to all bands above 420 MHz. See *The ARRL Operating Manual* for information about your area.

70 cm (420 MHz)*



33 cm (902 MHz)*



23 cm (1240 MHz)*

All licensees except Novices are authorized all modes on the following frequencies:

2300-2310 MHz	10.0-10.5 GHz *	122.25-123.0 GHz
2390-2450 MHz	24.0-24.25 GHz	134-141 GHz
3300-3500 MHz	47.0-47.2 GHz	241-250 GHz
5650-5925 MHz	76.0-81.0 GHz	All above 275 GHz

* No pulse emissions

KEY

Note:
CW operation is permitted throughout all amateur bands.

MCW is authorized above 50.1 MHz, except for 144.0-144.1 and 219-220 MHz.

Test transmissions are authorized above 51 MHz, except for 219-220 MHz

- = RTTY and data
- = phone and image
- = CW *only*
- = SSB phone
- = USB phone, CW, RTTY, and data
- = Fixed digital message forwarding systems *only*

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

See *ARRLWeb at www.arrl.org* for detailed band plans.

ARRL
We're At Your Service

ARRL Headquarters:
860-594-0200 (Fax 860-594-0259)
email: hq@arrl.org

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Toll-Free 1-888-277-5289 (860-594-0355)
email: orders@arrl.org

Membership/Circulation Desk:
www.arrl.org/membership
Toll-Free 1-888-277-5289 (860-594-0338)
email: membership@arrl.org

Getting Started in Amateur Radio:
Toll-Free 1-800-326-3942 (860-594-0355)
email: newham@arrl.org

Exams: 860-594-0300 email: vec@arrl.org

ARRL Ham Band CHART for Extra Class **

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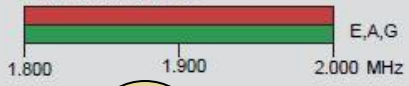
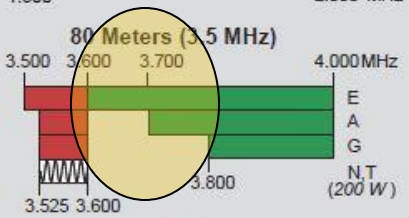


80 Meters (3.5 MHz)



60 Meters (5.3 MHz)

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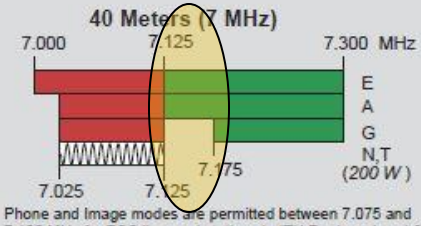
40 Meters (7 MHz)



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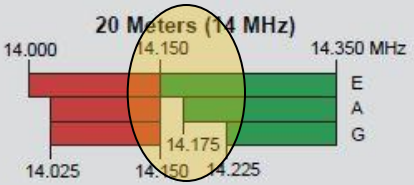
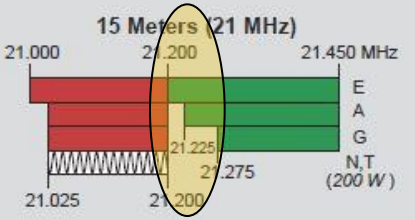
Avoid interference to fixed services outside the US.

20 Meters (14 MHz)

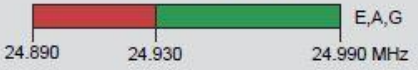


17 Meters (18 MHz)

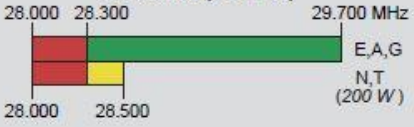
15 Meters (21 MHz)



12 Meters (24 MHz)



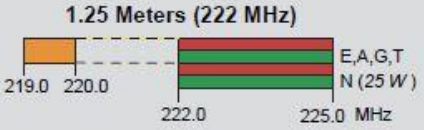
10 Meters (28 MHz)



6 Meters (50 MHz)

2 Meters (144 MHz)

1.25 Meters (222 MHz)



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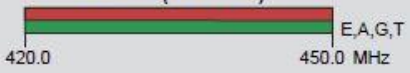
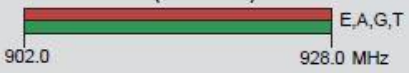
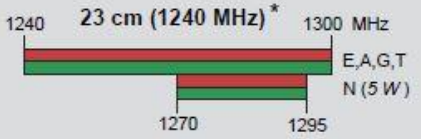


33 cm (902 MHz)*



23 cm (1240 MHz)*



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 rev. 4/12/2012

ARRL Ham Band CHART for Tech's *

US Amateur Radio Bands

US AMATEUR POWER LIMITS

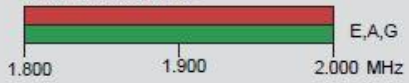
FCC 97.313 An amateur station must use the minimum transmitter power necessary to carry out the desired communications. (b) No station may transmit with a transmitter power exceeding 1.5 kW PEP.

Effective Date March 5, 2012

Published by: ARRL The national association for AMATEUR RADIO®
www.arrl.org
225 Main Street, Newington, CT USA 06111-1494

160 Meters (1.8 MHz)

Avoid interference to radiolocation operations from 1.900 to 2.000 MHz



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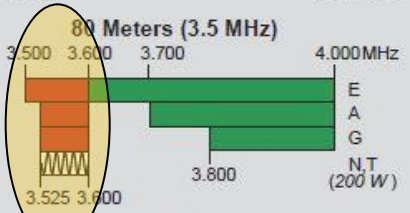

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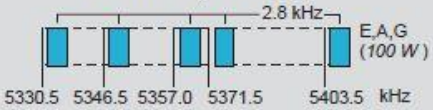

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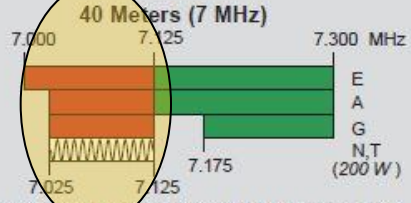

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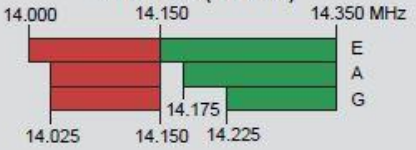

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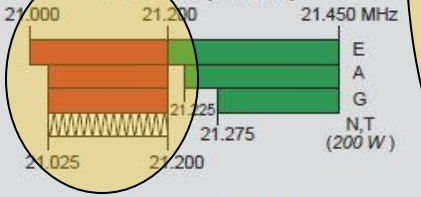

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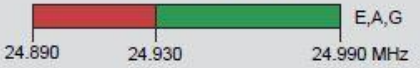

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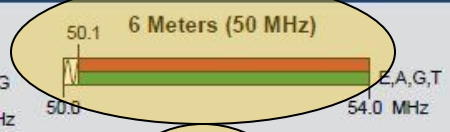

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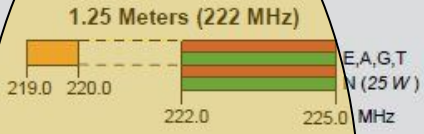

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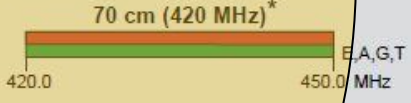

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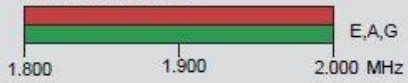

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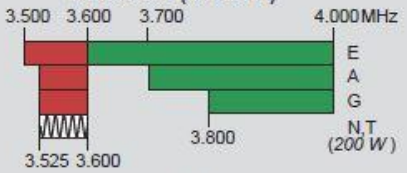

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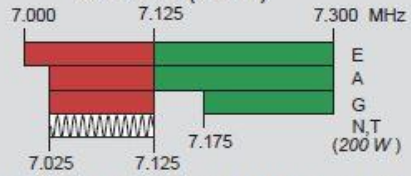

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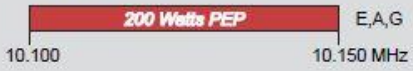

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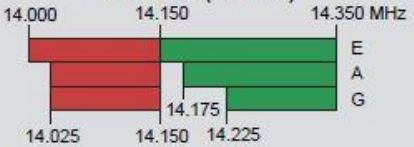

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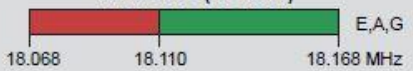

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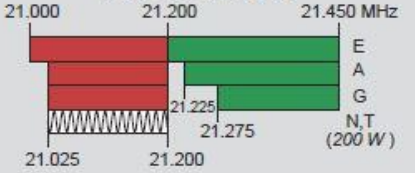

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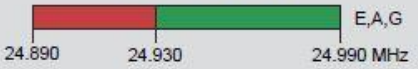

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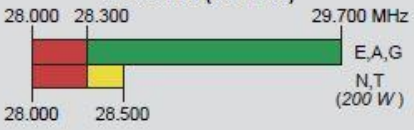

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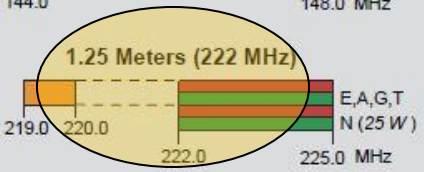

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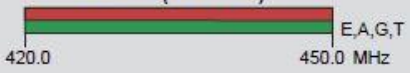

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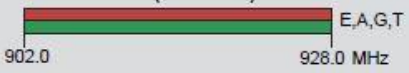

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Ham Bands Summary

LF (experimental)

135 KHz = 2200 meters, 470 KHz = 630 meters [2]

HF

160m, 80m, 60m, 40m, 30m, 20m, 17m, 15m, 12m, 10m [10]

VHF

6 meter, 2 meter & 1.25 meter band [3]

UHF

70 cm, 33 cm & 23 cm band [3]

Micro-Wave

2.3, 2.4, 3.3, 5.6, 10, 24, 47, 76, 122, 134, 241, 275 (GHz) [12]

[Total = 30 bands]

(3) Ham Radio Science

300

300 is a very magic number **

300 is a very magic number *

Speed of Radio Waves = Speed of Light

186,000 miles / sec (English)

300 million meters / sec (Metric)

Wave Length
vs
Frequency

Wavelength vs. Frequency

Speed of Radio Waves = Speed of Light

186,000 miles / sec (English)

300 million meters / sec (Metric)

- **WL (meters) = 300 / Frequency (MHz)**

or

- **Frequency (MHz) = 300 / WL (meters)**

HF Ham Bands

160 Meters	1.800 MHz – 2.000 MHz
80 Meters	3.500 MHz – 4.000 MHz
60 Meters (channels)	5.330, 5.346, 5.366, 5.371, 5.403 MHz
40 Meters	7.000 MHz – 7.300 MHz
30 Meters	10.100 MHz – 10.150 MHz
20 Meters	14.000 MHz – 14.350 MHz
17 Meters	18.068 MHz – 18.168 MHz
15 Meters	21.000 MHz – 21.450 MHz
12 Meters	24.890 MHz – 24.990 MHz
10 Meters	28.000 MHz – 29.700 MHz
6 Meters	50.0 MHz – 54.0 MHz (*)

Wavelength vs. Frequency

WL (meters) = 300 / Frequency (MHz)

What "band" (WL) is 10 MHz ?

WL = 300 / 10 MHz = 30 meter band

Wavelength vs. Frequency

Frequency (MHz) = 300 / WL (meters)

What "Frequency" is the 30 meter band ?

Frequency = 300 / 30 meters = 10 MHz

HF Ham Bands

160 Meters	1.800 MHz – 2.000 MHz
80 Meters	3.500 MHz – 4.000 MHz
60 Meters (channels)	5.330, 5.346, 5.366, 5.371, 5.403 MHz
40 Meters	7.000 MHz – 7.300 MHz
30 Meters	10.100 MHz – 10.150 MHz
20 Meters	14.000 MHz – 14.350 MHz
17 Meters	18.068 MHz – 18.168 MHz
15 Meters	21.000 MHz – 21.450 MHz
12 Meters	24.890 MHz – 24.990 MHz
10 Meters	28.000 MHz – 29.700 MHz
6 Meters	50.0 MHz – 54.0 MHz (*)

Mega Hertz
vs
Kilo Hertz

Mega-Hertz vs. Kilo-Hertz

1 Mega (Hertz) = 1000 Kilo (Hertz)

1000 Kilo (Hertz) = 1 Mega (Hertz)

So

Kilo-hertz = Mega-hertz X 1000

and

Mega-hertz = Kilo-hertz / 1000

Tech / Novice **HF Bands**

80 M - CW	**3.525 MHz – 3.600 MHz**
40 M - CW	**7.025 MHz – 7.125 MHz**
15 M - CW	**21.025 MHz – 21.200 MHz**
10 M – CW / Data	**28.000 MHz – 28.300 MHz**
10 M - SSB	**28.300 MHz – 28.500 MHz**
6 M – ALL Modes	**50.0 MHz – 54.0 MHz**

Mega-Hertz vs. Kilo-Hertz

Kilo-hertz = Mega-hertz X 1000

7.025 MHz X 1000 = 7025 KHz

Tech / Novice **HF Bands**

80 M - CW	**3.525 MHz – 3.600 MHz** **3525 KHz – 3600 KHz**
	KHz used usually just for the low bands
40 M - CW	**7.025 MHz – 7.125 MHz** **7025 KHz – 7125 KHz**
15 M - CW	**21.025 MHz – 21.200 MHz**
10 M – CW / Data	**28.000 MHz – 28.300 MHz**
10 M - SSB	**28.300 MHz – 28.500 MHz**
6 M – ALL Modes	**50.0 MHz – 54.0 MHz**

468

468 is another magic number

How long should I make my antenna ?

Dipole Antenna ****

Dipole Antenna (length) = ½ wavelength

Dipole Antenna ***

Dipole Antenna (length) = ½ wavelength

Antenna Length (feet) = 468 / Frequency (MHz)

Dipole Antenna **

Dipole Antenna (length) = ½ wavelength

Antenna Length (feet) = 468 / Frequency (MHz)

Antenna Length = 468 / 7.025 **40 Meter Band**

Dipole Antenna *

Dipole Antenna (length) = ½ wavelength

Antenna Length (feet) = 468 / Frequency (MHz)

Antenna Length = 468 / 7.025 **40 Meter Band**

Antenna Length = 66.62 Feet

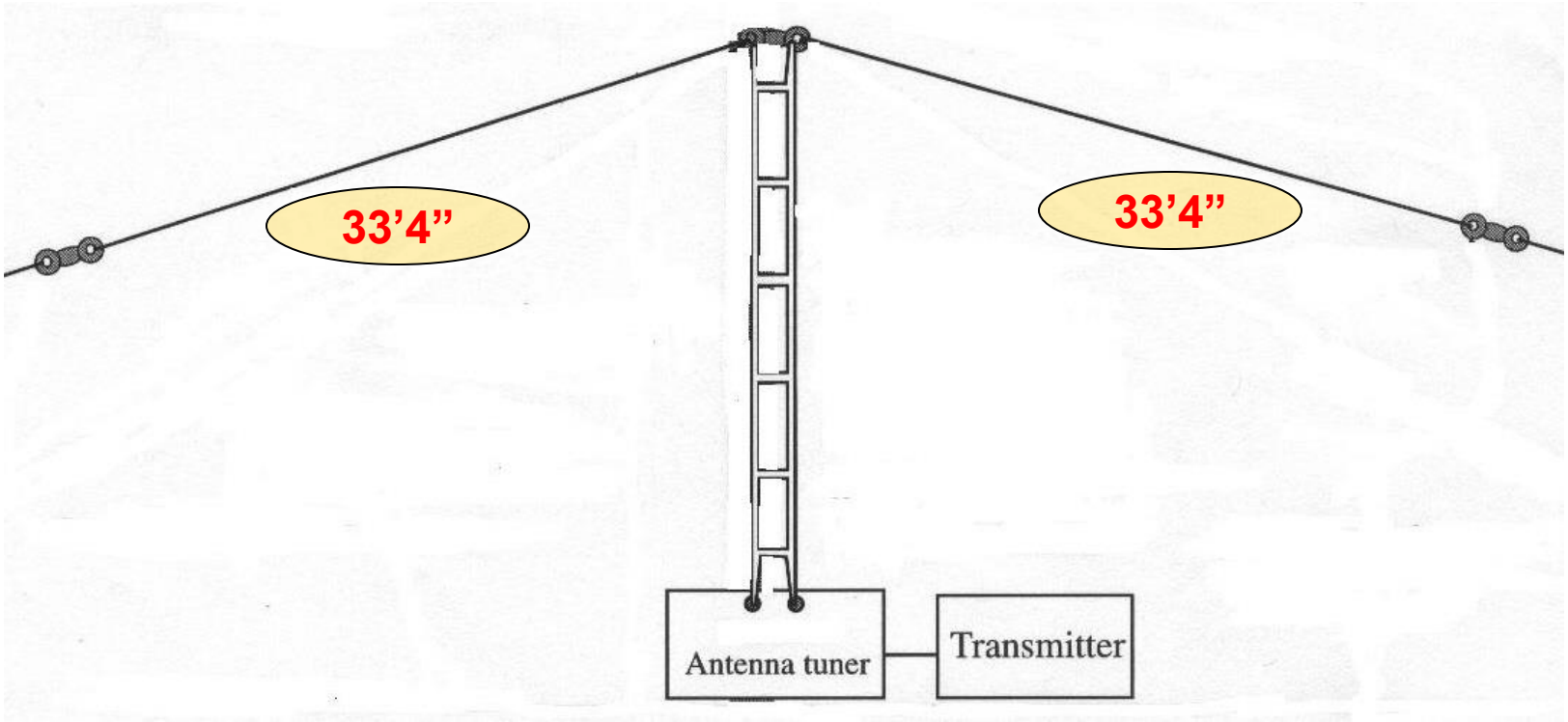
Dipole Antenna

Dipole Antenna (length) = ½ wavelength

Antenna Length (feet) = 468 / Frequency (MHz)

Antenna Length = 468 / 7.025 **40 Meter Band**

Antenna Length = 66.62 Feet



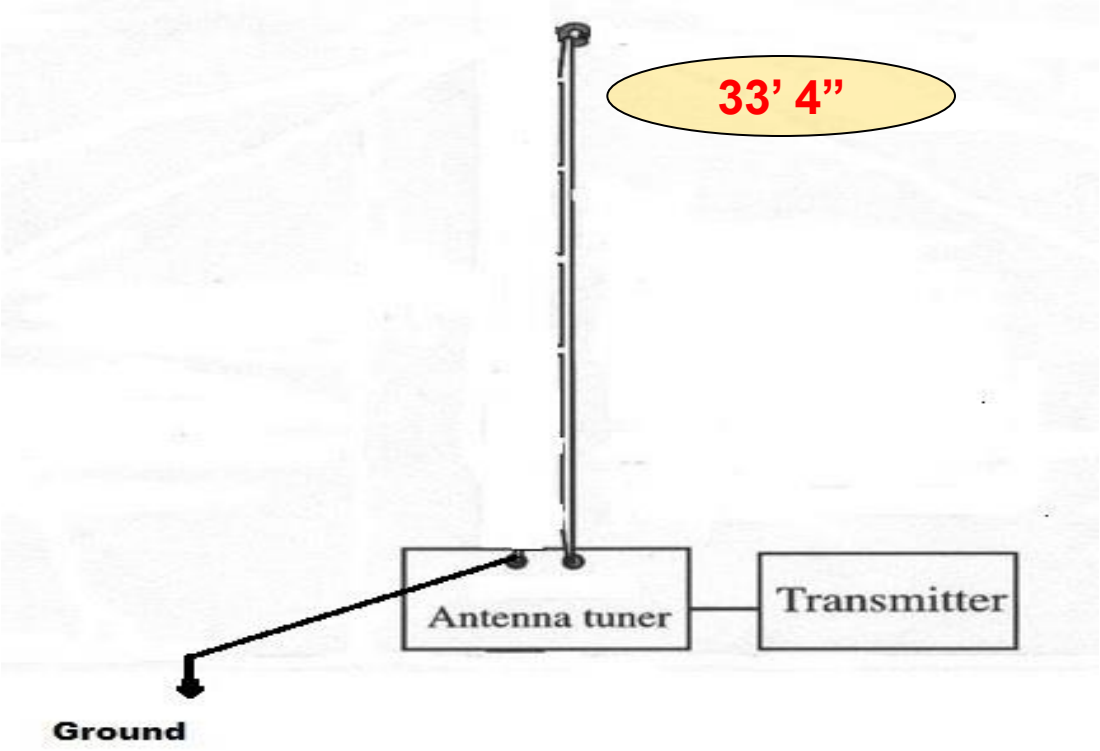
Vertical Antenna

Vertical Antenna (length) = 1/4 wavelength

Dipole Length = 66.62 Feet / 2

Antenna Length = 33 Feet 4 inches

Vertical Antenna (length) = ¼ wavelength = Dipole length divide by 2



Tech / Novice HF Bands

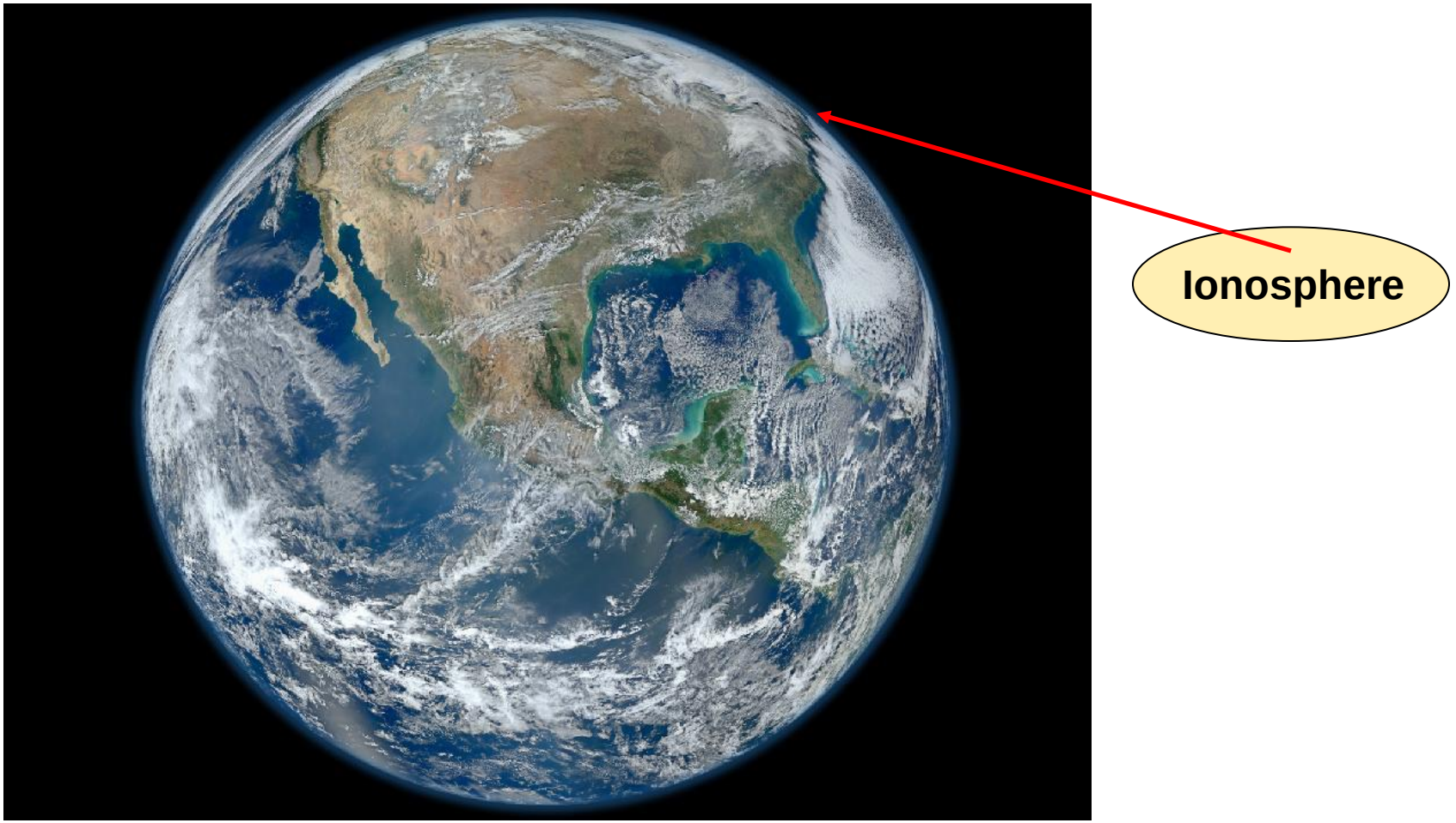
80 M - CW	3.525 MHz – 3.600 MHz
132’9”	
40 M - CW	7.025 MHz – 7.125 MHz
66’7”	
15 M - CW	21.025 MHz – 21.200 MHz
22’3”	
10 M – CW / Data	28.000 MHz – 28.300 MHz
10 M - SSB	28.300 MHz – 28.500 MHz
16’8”	
6 M – ALL Modes	50.0 MHz – 54.0 MHz
9’4”	

½ Wave Dipole lengths above
¼ Wave Vertical lengths = 1/2 of above

Radio Wave Propagation

The Ionosphere ***

A Hams best friend



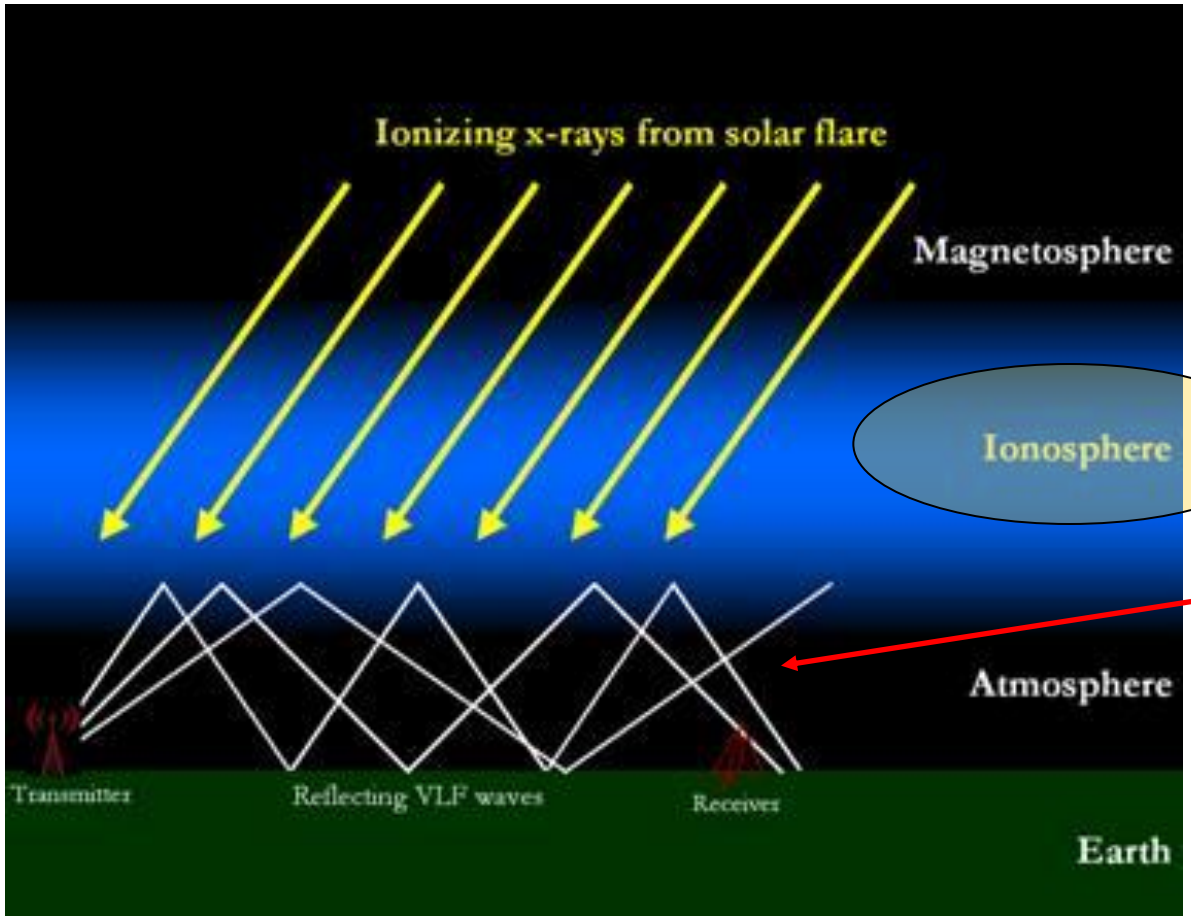
The Ionosphere **

A Hams best friend

Aurora Borealis

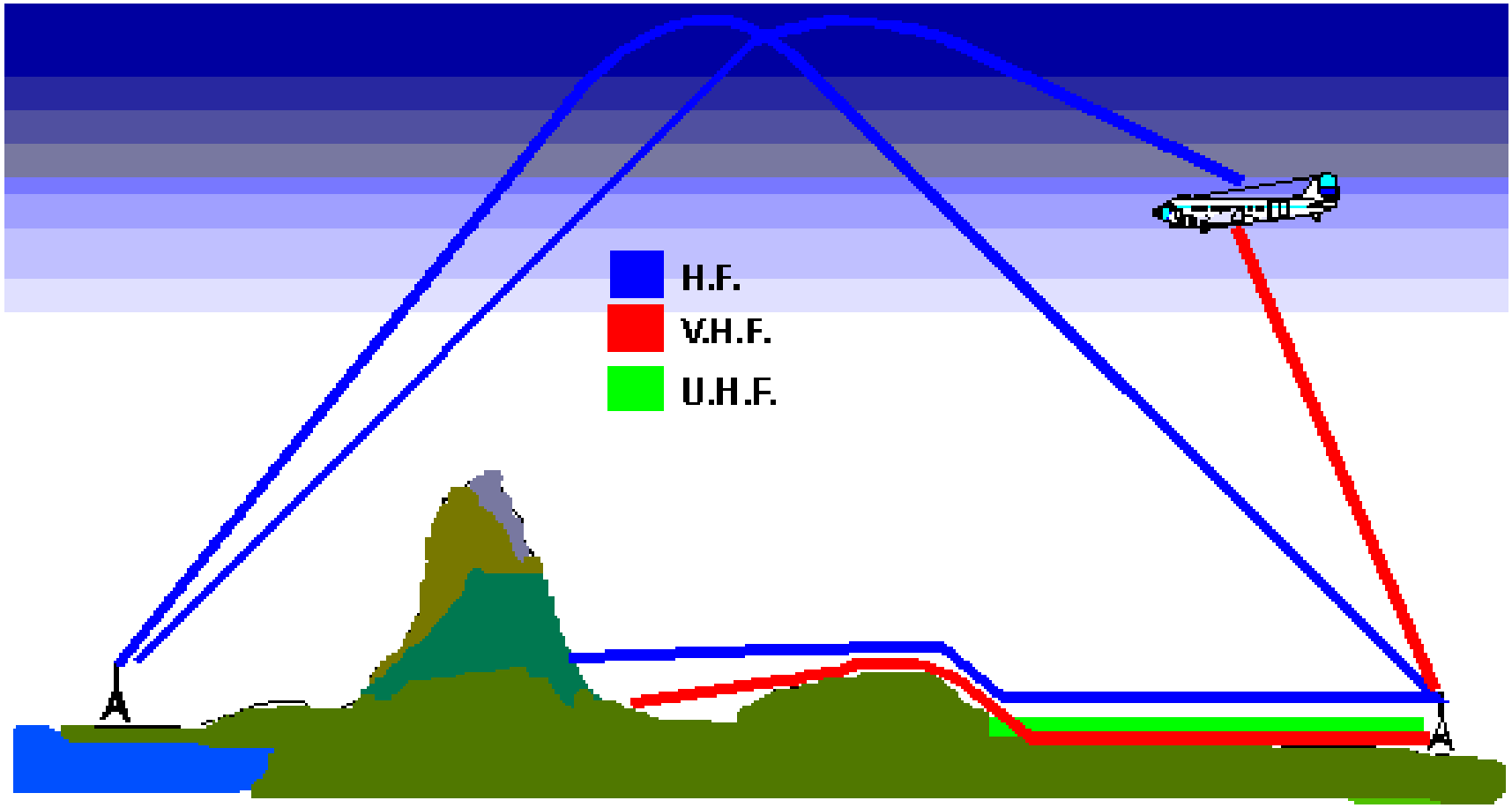
The Ionosphere *

A Hams best friend

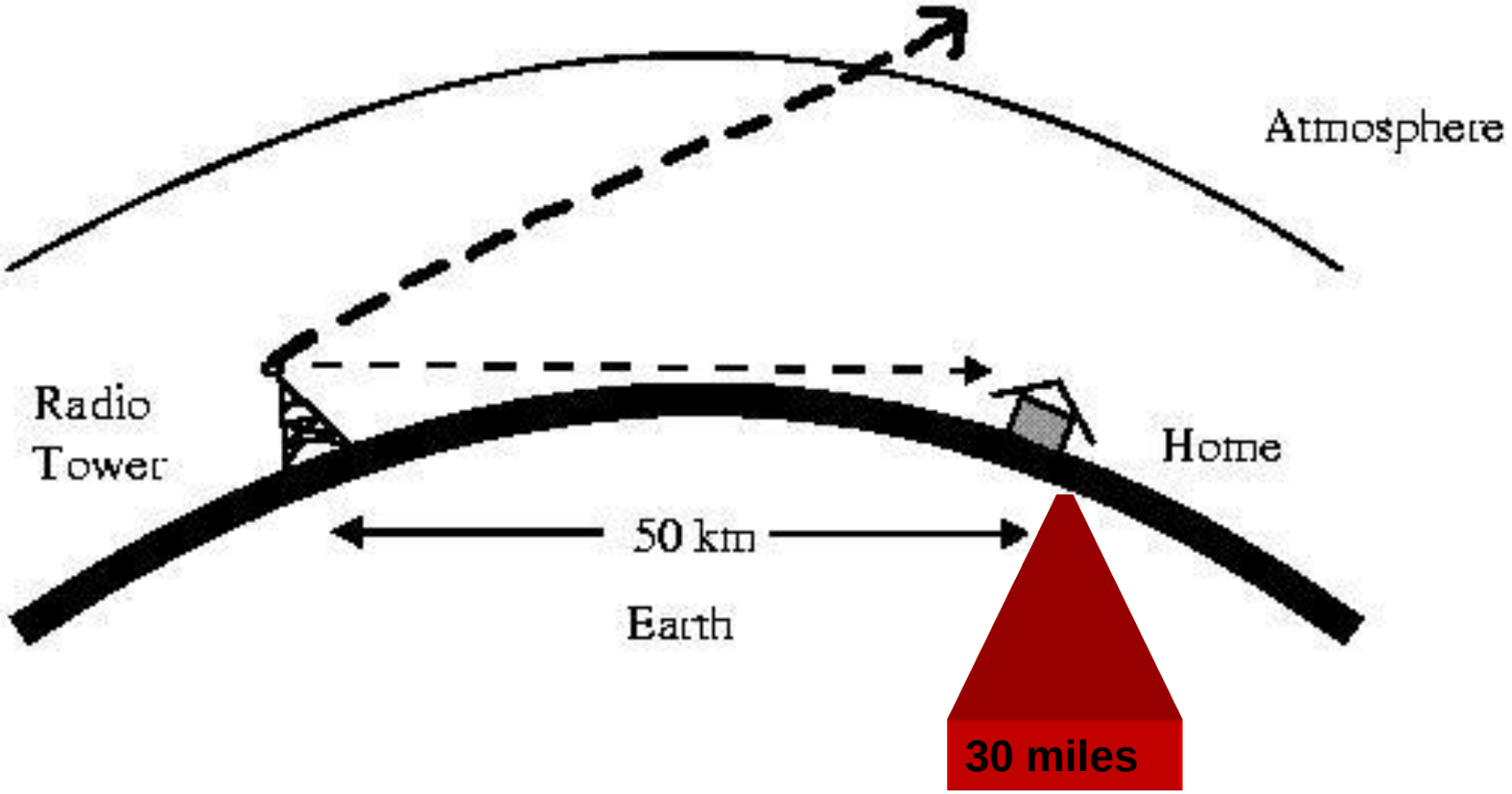


The Ionosphere

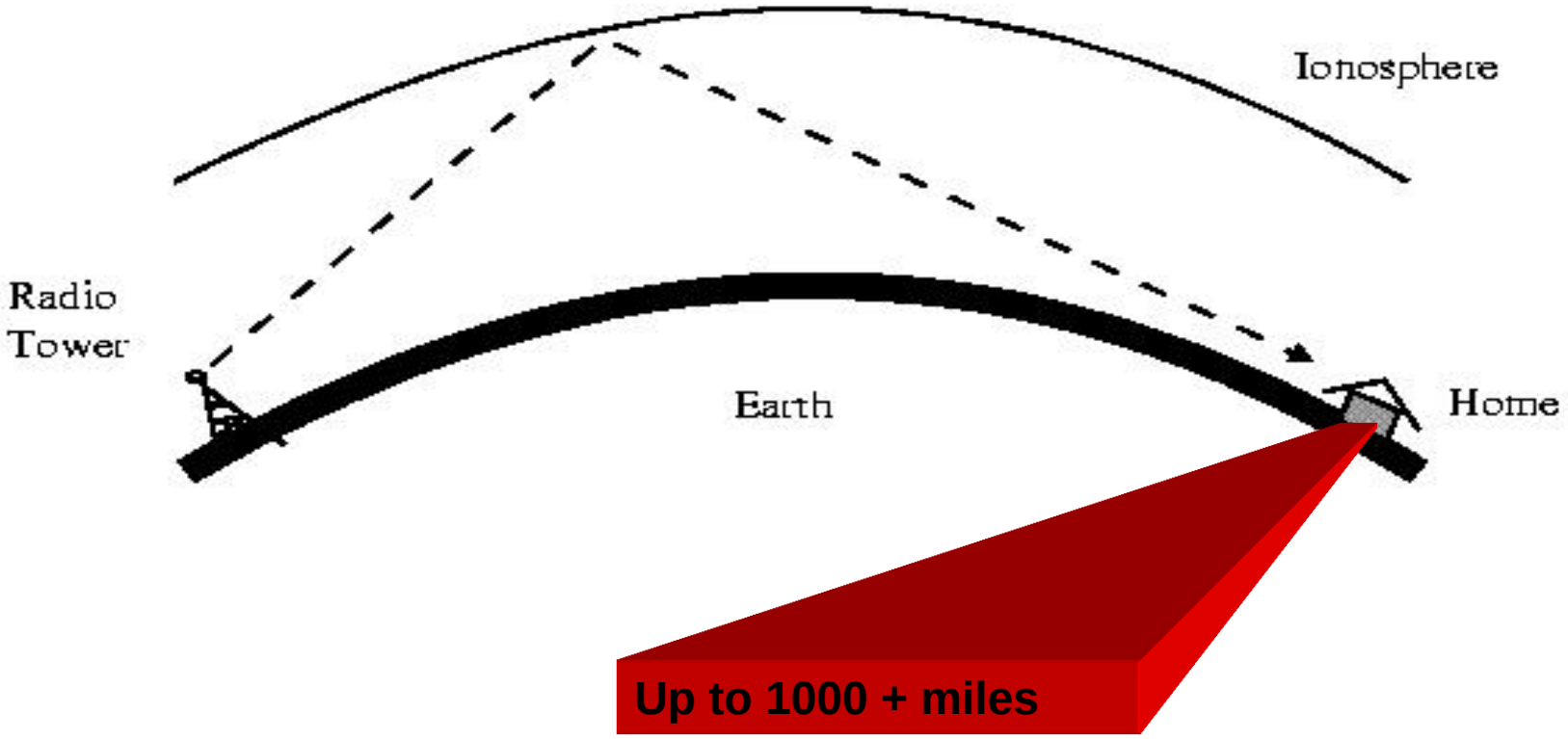
A Hams best friend



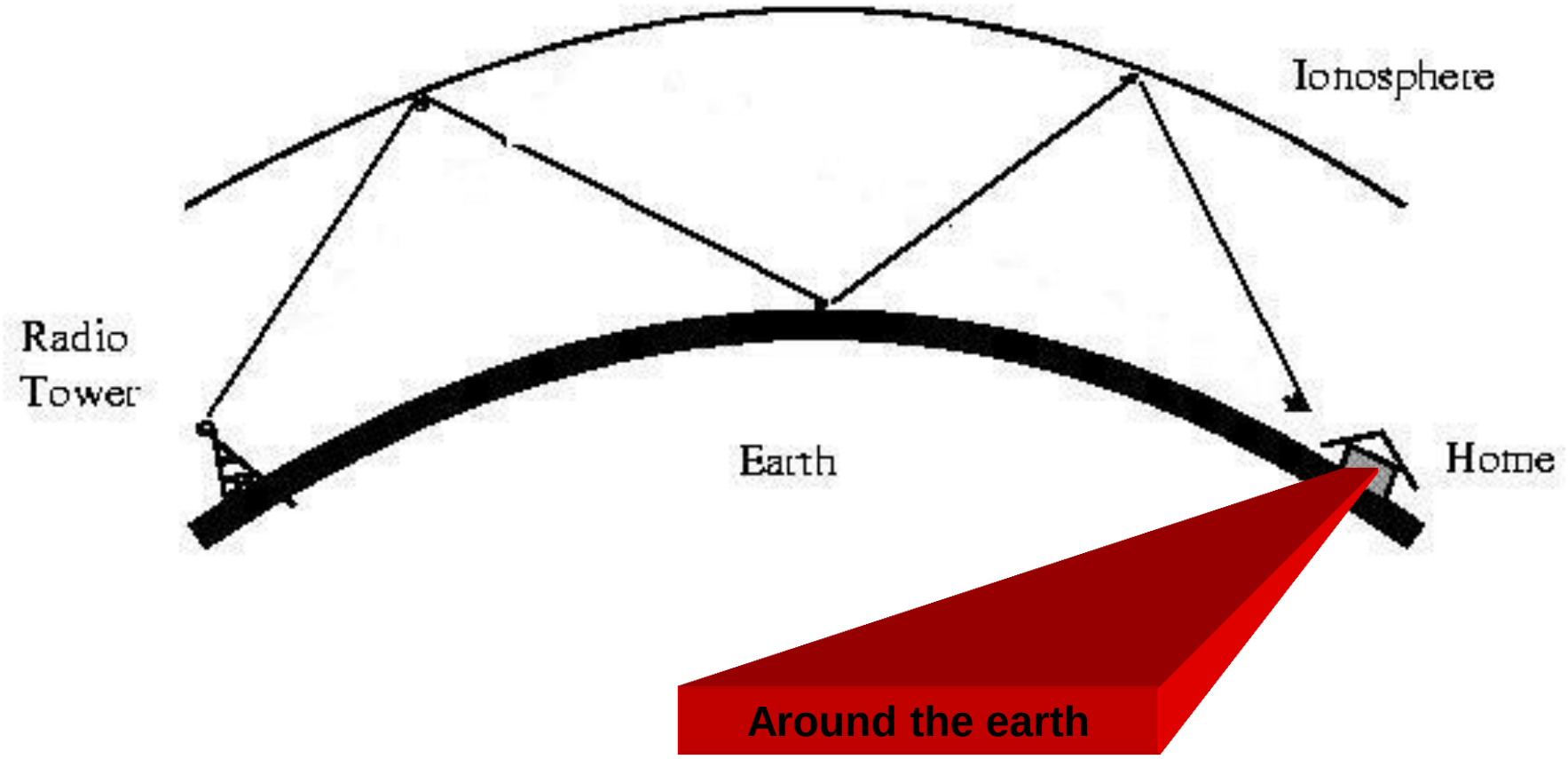
VHF / UHF
Line of Sight Communications



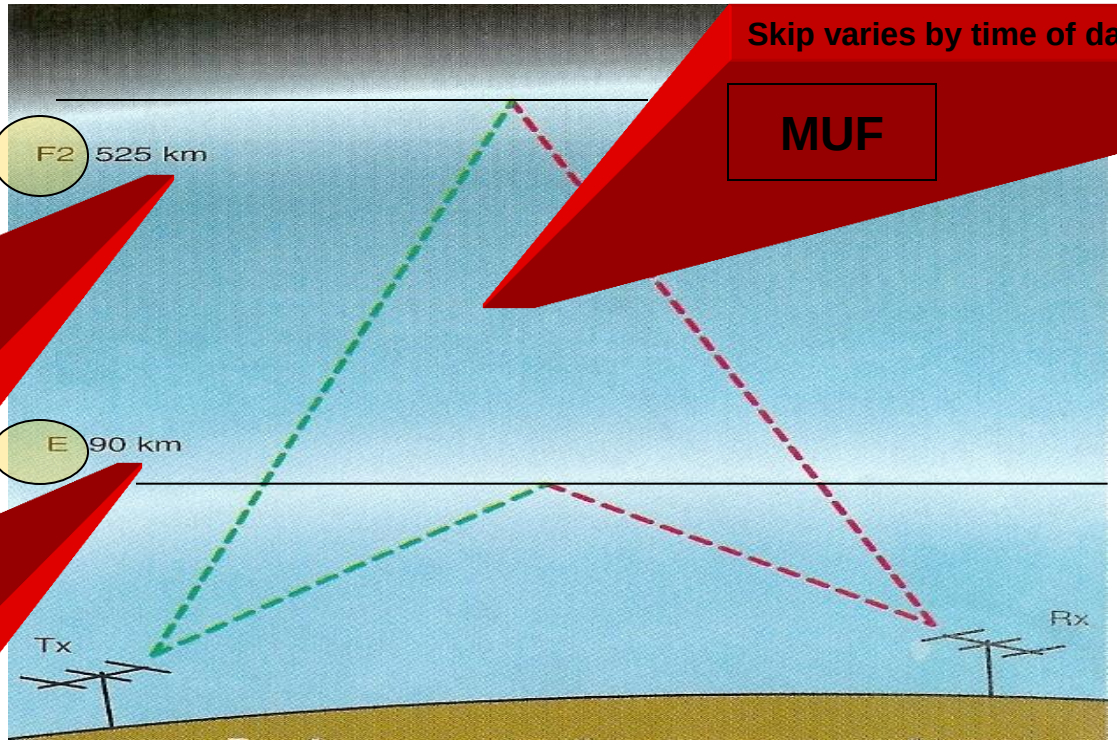
HF Signal Skip



HF Signal Skip Multi-Hop



Ionosphere Layers (skip)



Skip varies by time of day and wave length

MUF

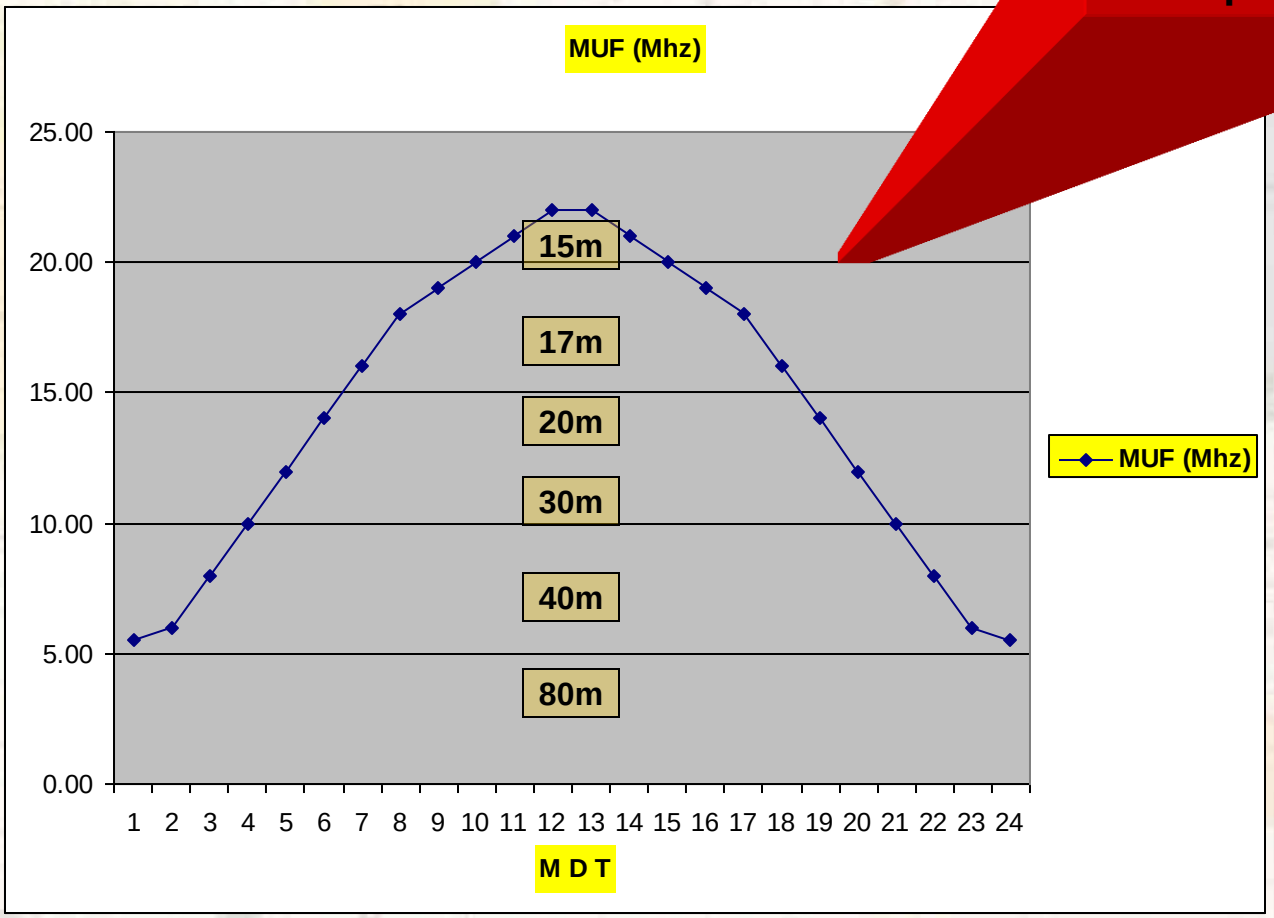
250 miles high

60 miles high

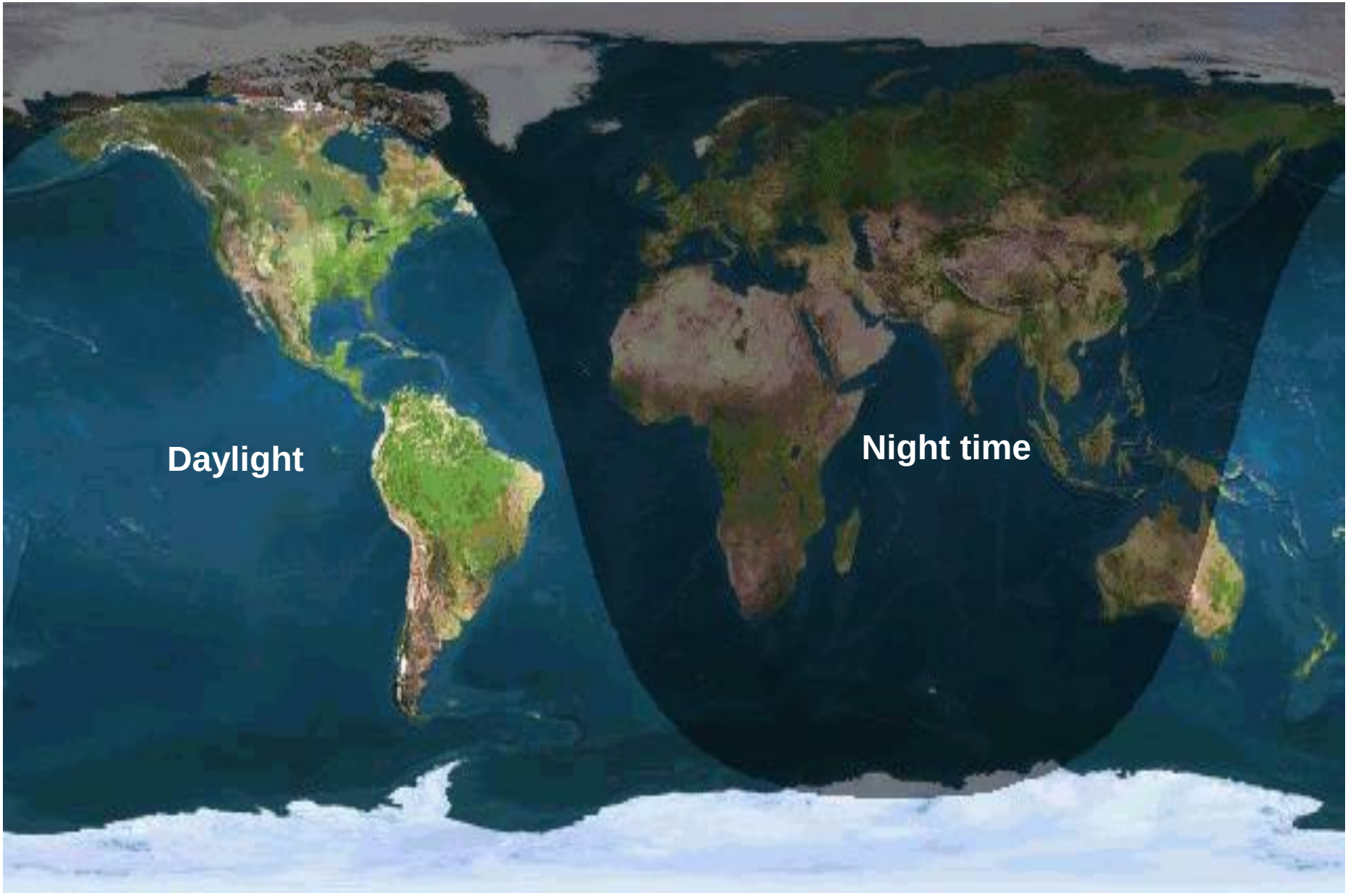
MUF

Effected by 11 year Sun Spot Cycle

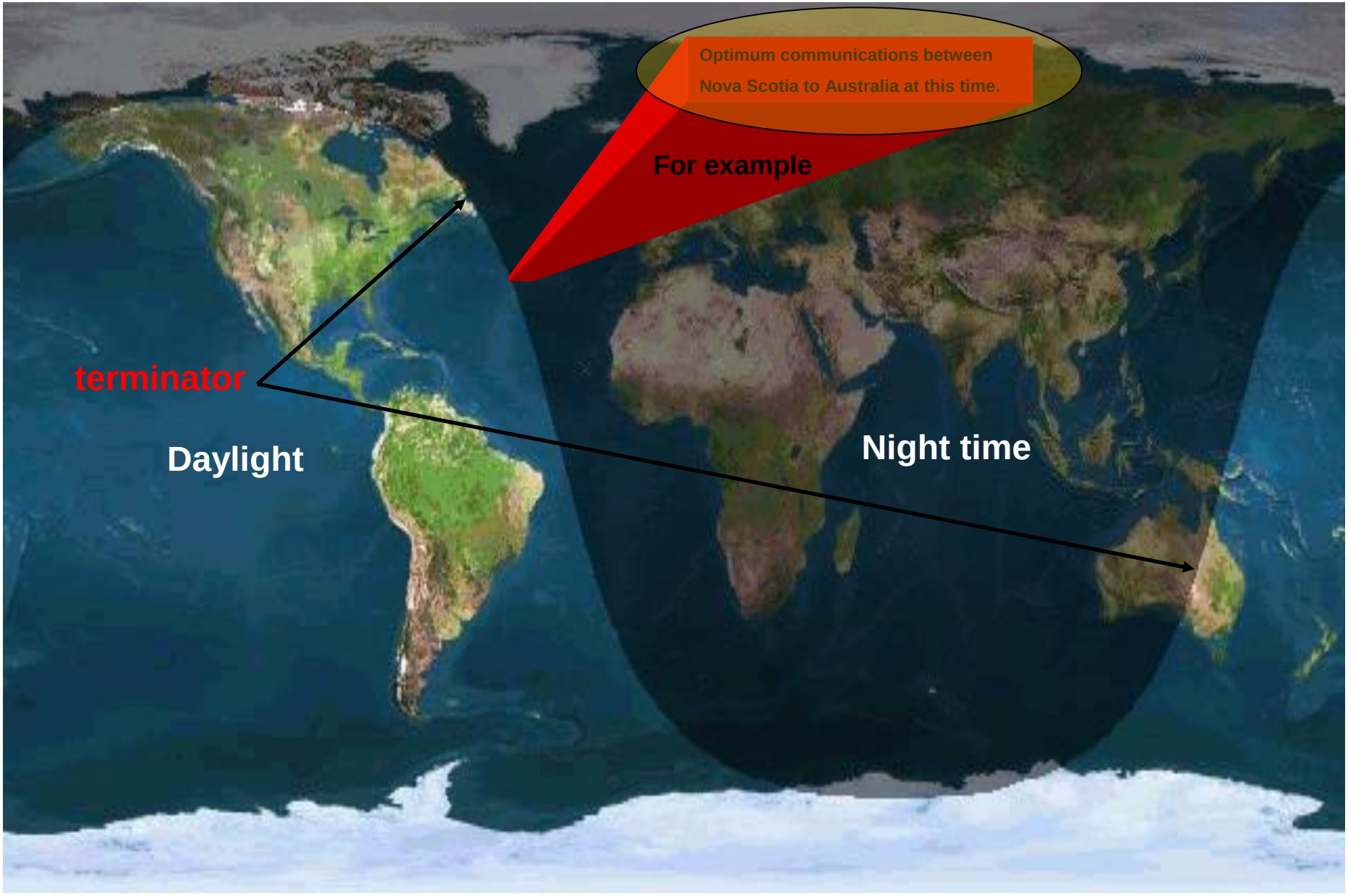
Maximum Useable Frequency



Gray Line Terminator *



Gray Line Terminator



HF Band Openings

HF Band Openings ****

Morning

- 20, 30, 40 meters

HF Band Openings ***

Morning

- 20, 30, 40 meters

Mid day

- 10, 15, 20, 30 meters

HF Band Openings **

Morning

- 20, 30, 40 meters

Mid day

- 10, 15, 20, 30 meters

Evening (early)

- 20, 30, 40 meters

HF Band Openings *

Morning

- 20, 30, 40 meters

Mid day

- 10, 15, 20, 30 meters

Evening (early)

- 20, 30, 40 meters

Evening (late)

- 40, 80 meters

HF Band Openings

Morning

- 20, 30, 40 meters

Mid day

- 10, 15, 20, 30 meters

Evening (early)

- 20, 30, 40 meters

Evening (late)

- 40, 80 meters

Night time

- 80, 160 meters

Low Bands

Signal Strength

Signal Strength ***

POWER OUTPUT	RECEIVED SIGNAL
100 Watts	S9 (assume)

Signal Strength **

POWER OUTPUT	RECEIVED SIGNAL
100 Watts	S9 (assume)
10 Watts	S7

Signal Strength *

POWER OUTPUT	RECEIVED SIGNAL
100 Watts	S9 (assume)
10 Watts	S7
1 Watt	S5

Signal Strength

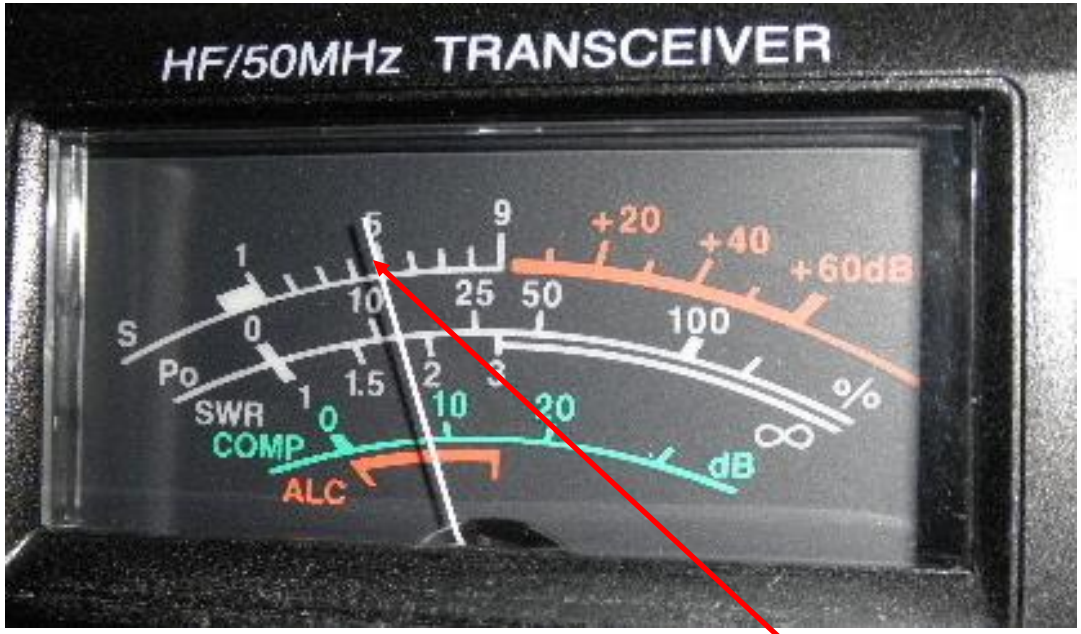
POWER OUTPUT	RECEIVED SIGNAL
100 Watts	S9 (assume)
10 Watts	S7
1 Watt	S5
1/10 of a Watt	S3

Antenna Gain

Antenna Gain

- Antenna design can increase the effective radiated power of your transmitter/station.
- This is called "Antenna Gain"
- A wire antenna has "0" gain
- Yagi beam antennas can have considerable gain depending on the number of elements and is measured in "db's".

Antenna Gain **



POWER OUTPUT	ANTENNA GAIN	Effective Radiated Power	RECEIVED SIGNAL
1 Watt	0 db	1 Watt	S5 (assumed)

Antenna Gain *

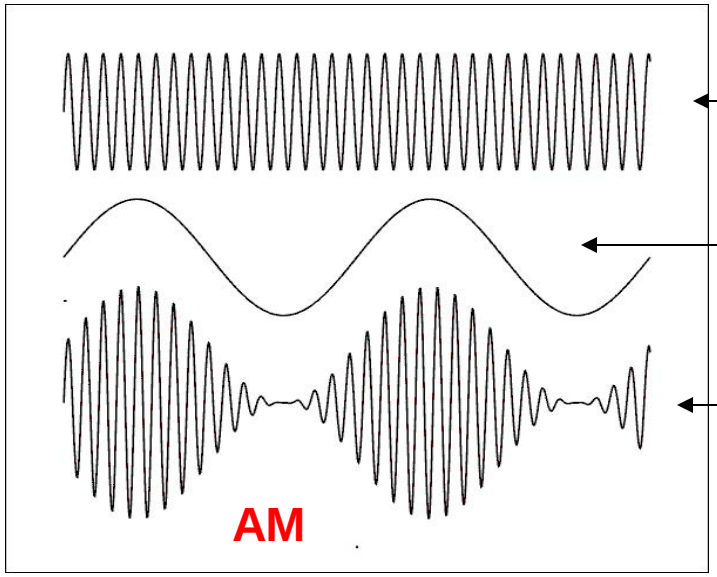
POWER OUTPUT	ANTENNA GAIN	Effective Radiated Power	RECEIVED SIGNAL
1 Watt	0 db	1 Watt	S5 (assumed)
1 Watt	10 db	10 Watts	S7

Antenna Gain

POWER OUTPUT	ANTENNA GAIN	Effective Radiated Power	RECEIVED SIGNAL
1 Watt	0 db	1 Watt	S5 (assumed)
1 Watt	10 db	10 Watts	S7
1 Watt	20 db	100 Watts	S9

Types of Modulation

Modulation Types ***

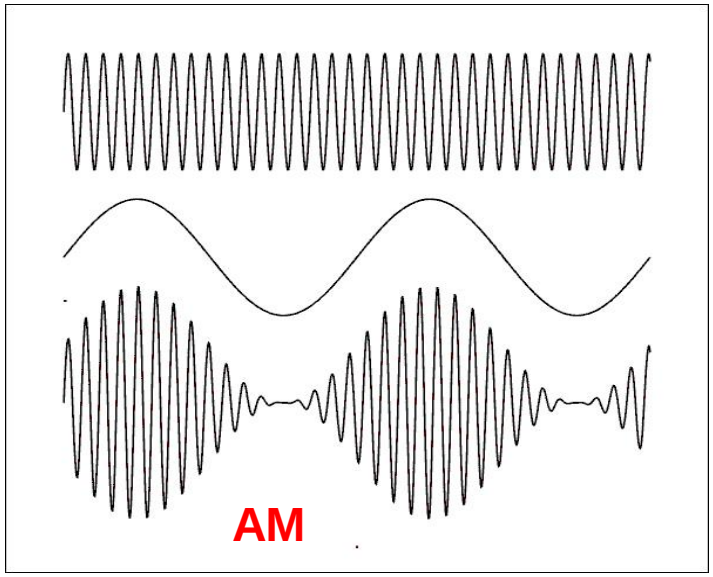


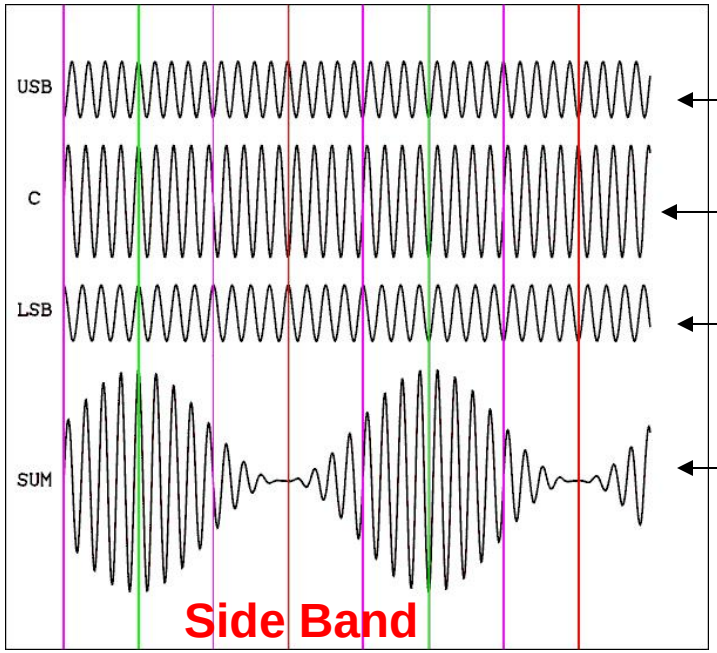
RF Carrier

Audio Modulation

Amplitude Modulated RF

Modulation Types **





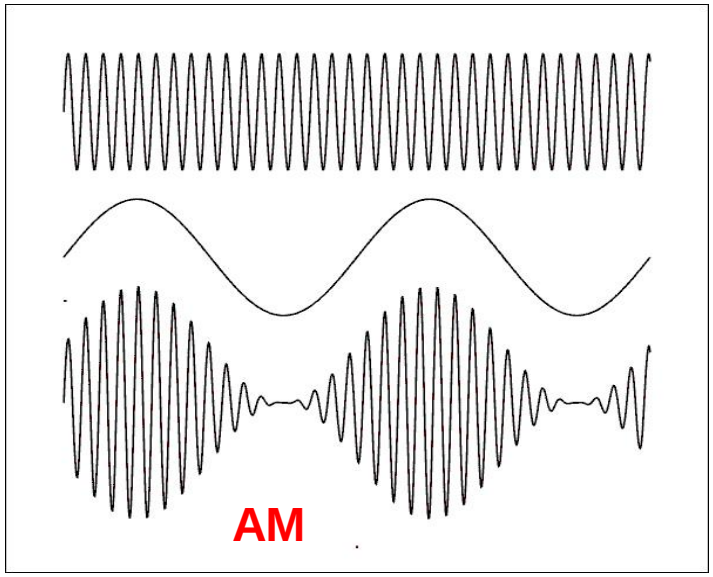
Upper Sideband

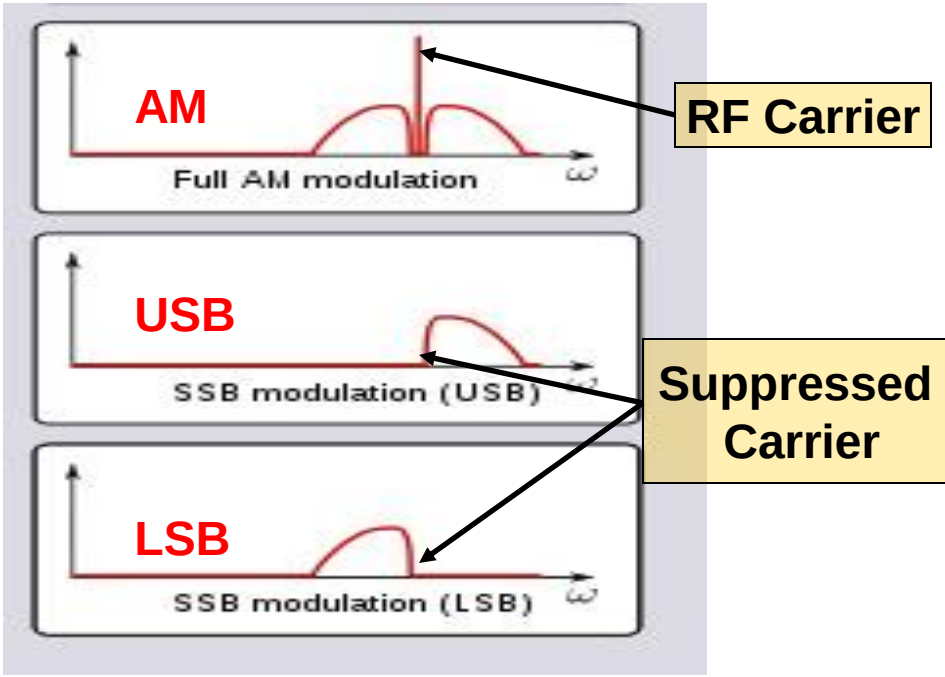
RF Carrier

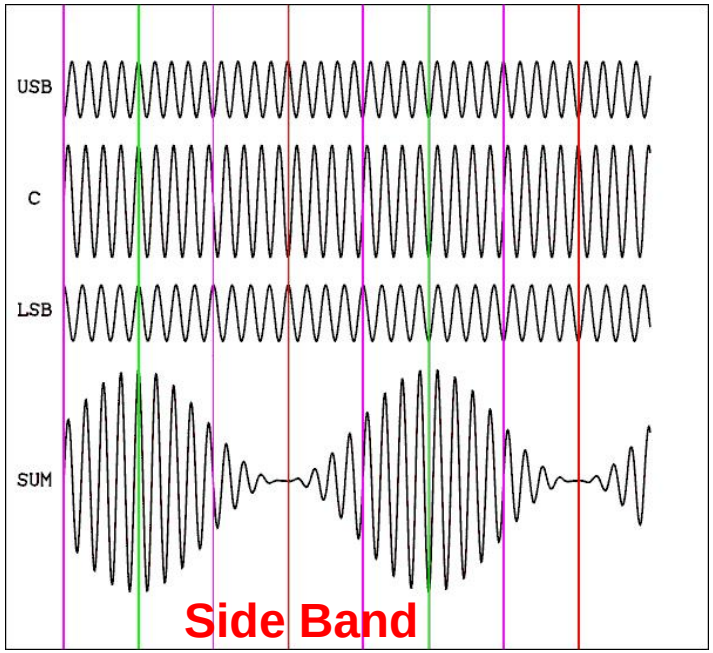
Lower Sideband

Double Sideband Modulated RF

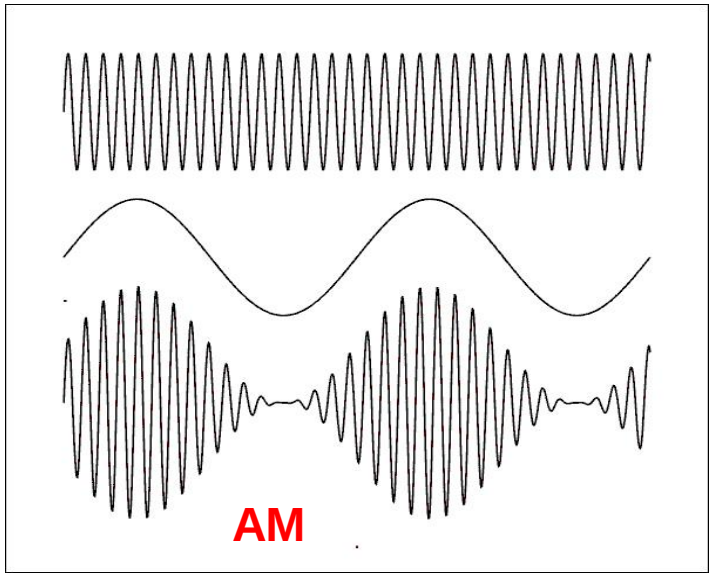
Modulation Types *

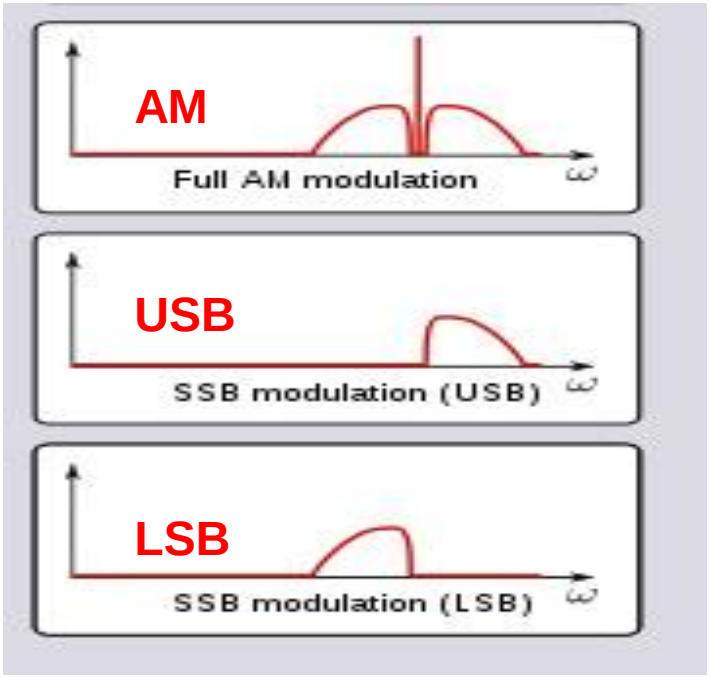


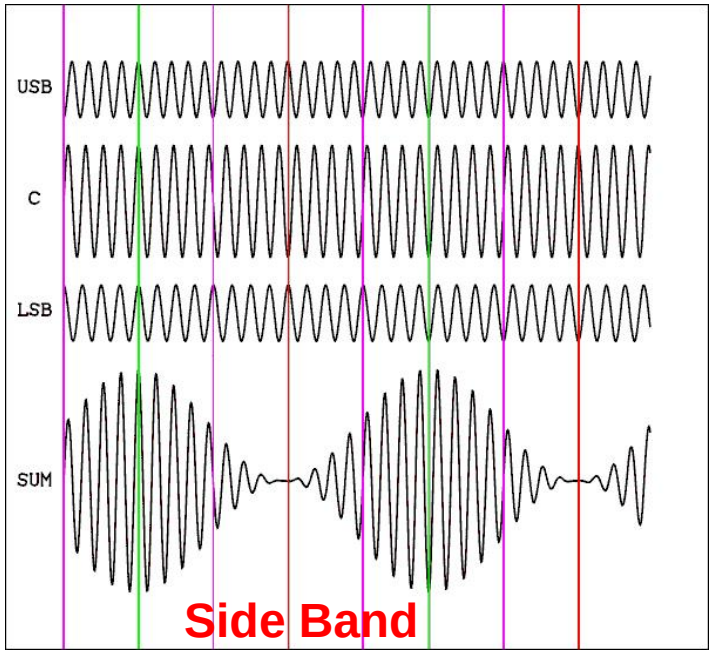


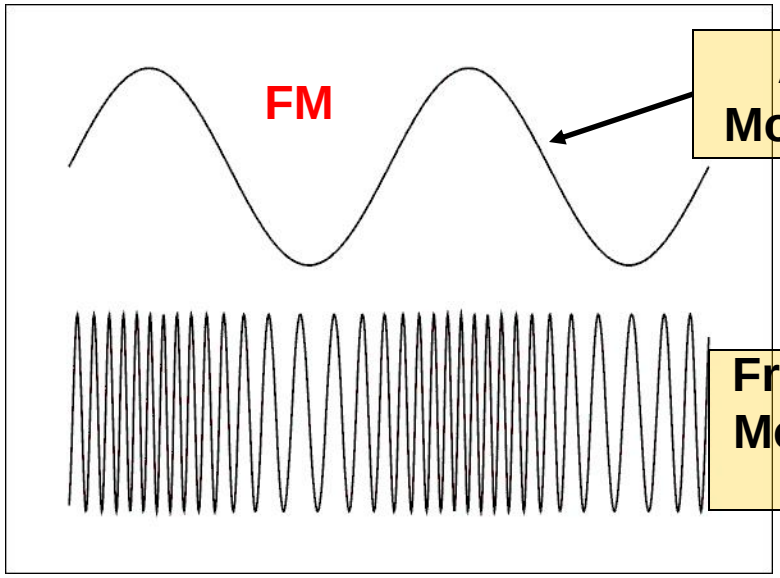


Modulation Types









HF Modes of Operation

HF Modes of Operation **

VOICE MODES

- AM (Amplitude Modulation)
- SSB (Single Side Band)
  - USB (Upper Sideband) >>> Above 10 MHz
  - LSB (Lower Sideband) >>> Below 10 MHz
- FM narrow (Frequency Modulation) >>> Above 29 MHz (10 meter band)
- FM wide (VHF/UHF only) >>> not-HF >>> Analog Television

HF Modes of Operation *

VOICE MODES

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MORSE CODE

- CW (Continuous Wave)
  - Straight Key
  - Semi-Automatic Key (bug)
  - Paddle – Dual Lever (requires an Electronic Keyer)

HF Modes of Operation

VOICE MODES

- AM (Amplitude Modulation)
- SSB (Single Side Band)
  - USB (Upper Sideband) >>> Above 10 MHz
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MORSE CODE

- CW (Continuous Wave)
  - Straight Key
  - Semi-Automatic Key (bug)
  - Paddle – Dual Lever (requires an Electronic Keyer)

DIGITAL MODES

- RTTY (Radio Teletype - LSB) (like a wireless/radio "AP News Service")
- AMTOR
- HF Packet
- SSTV (Slow Scan TV) (like wireless/radio "Color FAX")
- PSK31 (Phase Shift Keying - USB) (like a wireless/radio "Instant Message Chat")
- JT65, WSPR, FL-Digi, FSQ (Fast Simple Qso)
- Etc…

Digital Modes

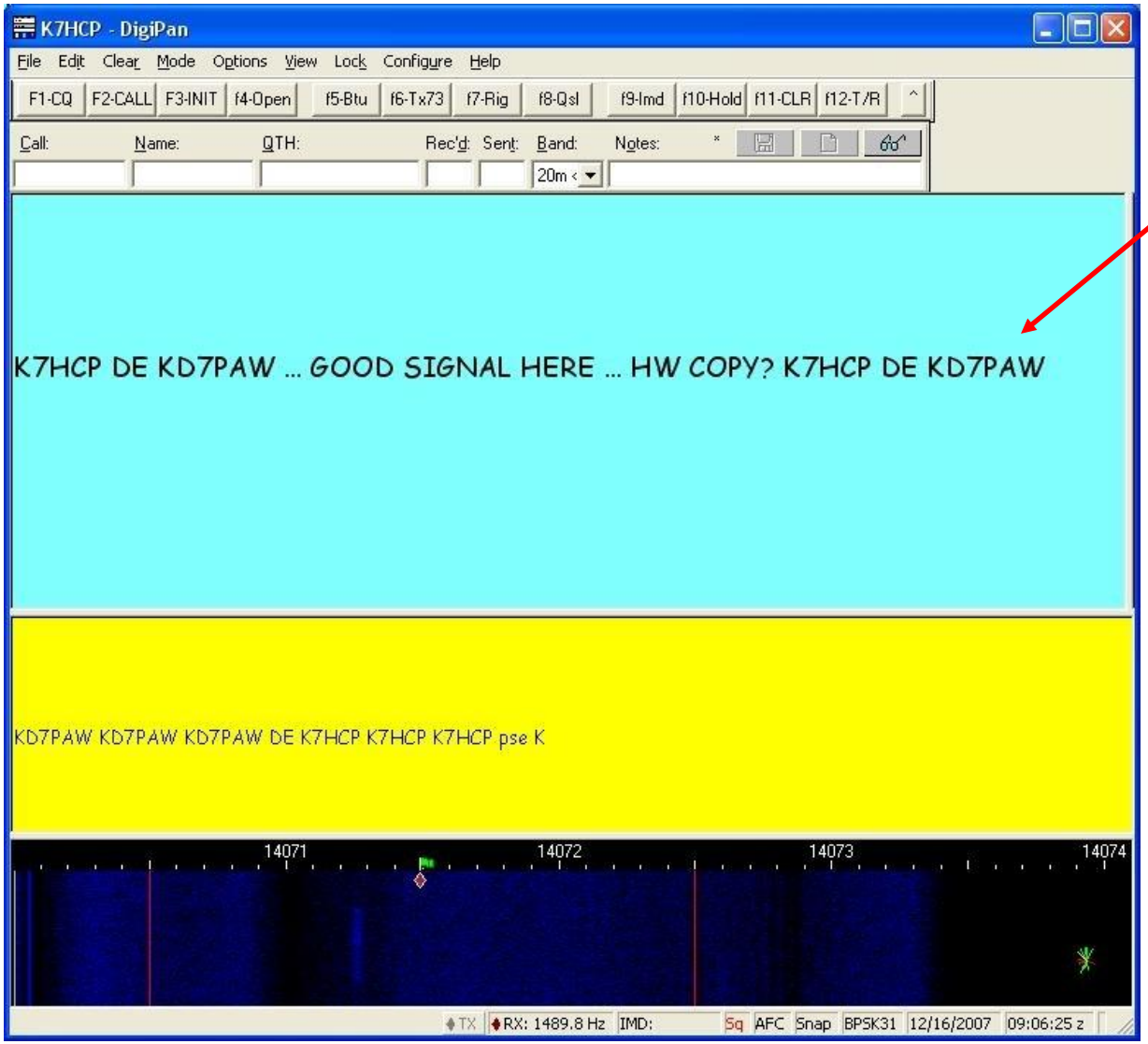
Digital Mode Listening

Minimum Configuration

1 SW Radio (ssb/cw), 2 Computer (w/sound card & microphone

3 plus FREE software app (psk31)

PSK31 Receive Screen



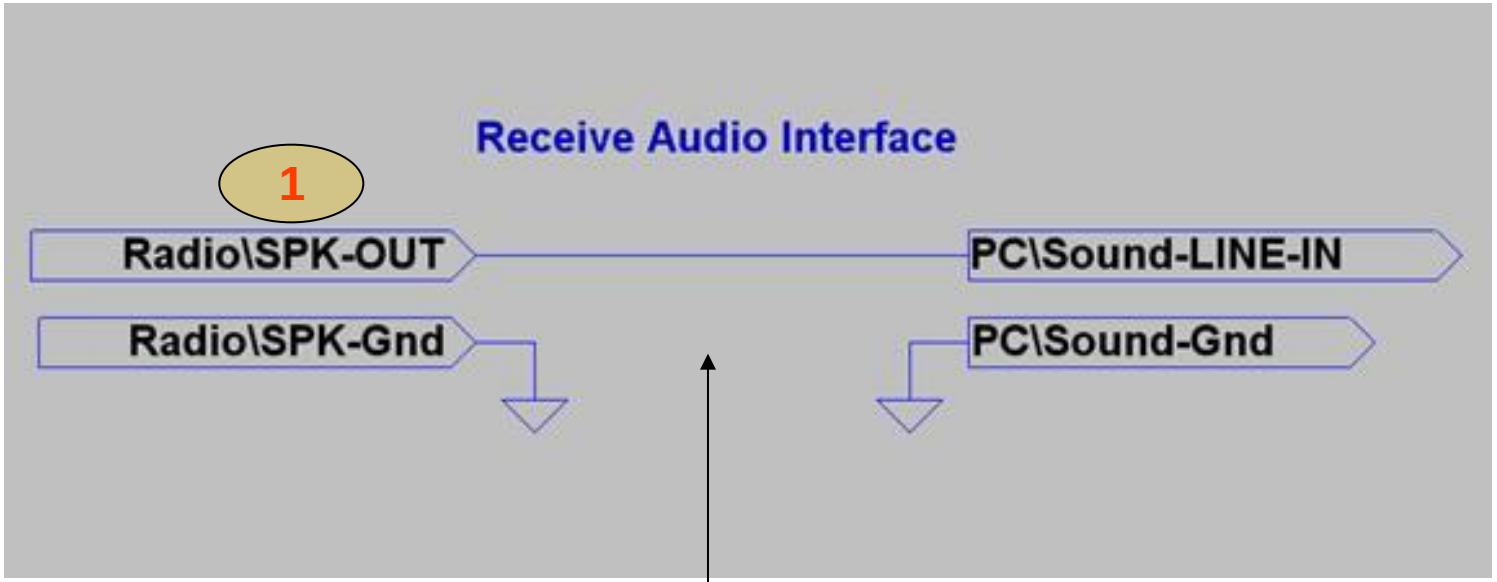
Receive Data

Digital Mode Interface Project

for

Transmit & Receive

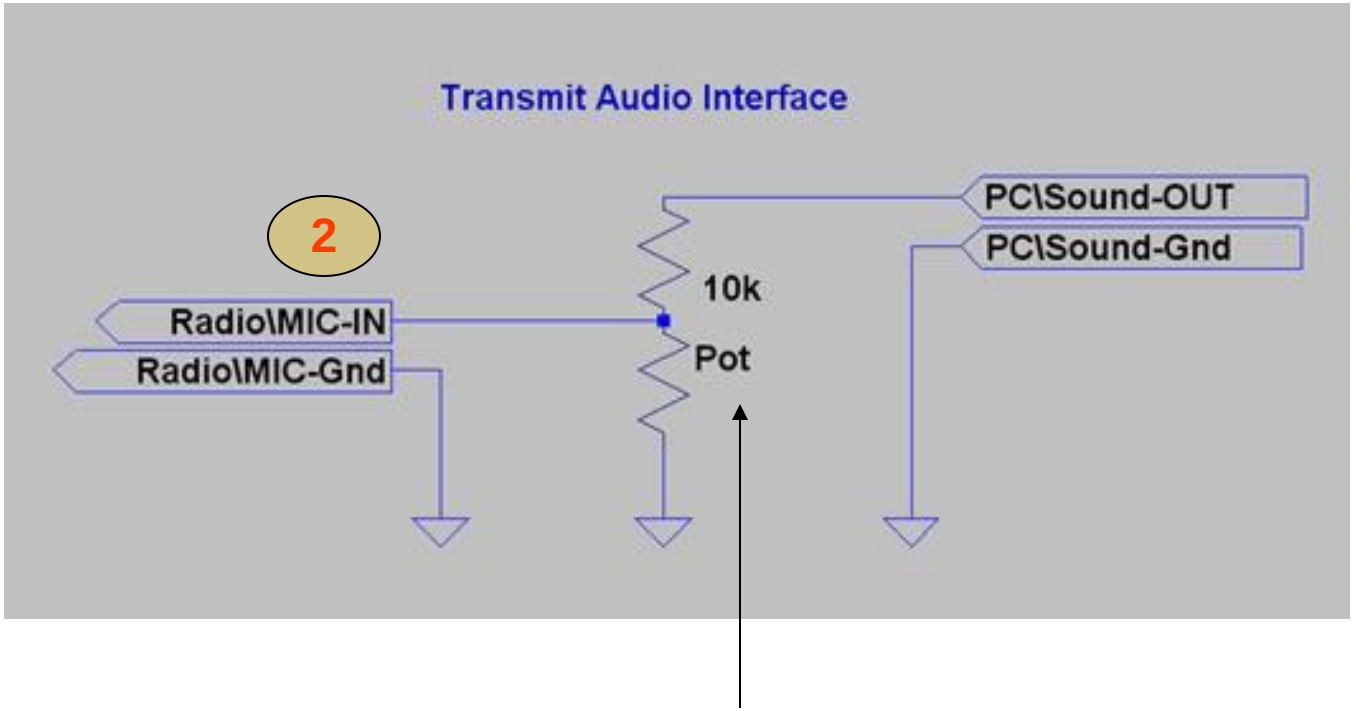
Speaker-Out >>> Line-In



Direct connection - preferred method

Use direct connect stereo cable instead of microphone

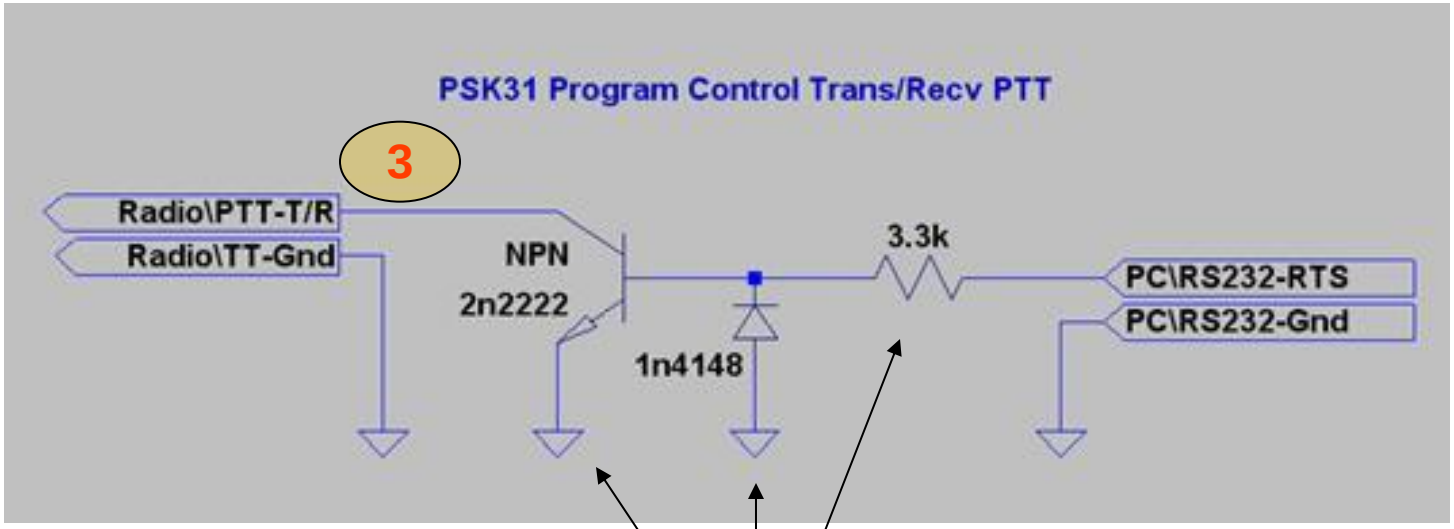
Sound-Out >>> Mic-In



Various radios require different mic level settings

Basic PTT Interface

PC RS232 >>> Radio PTT



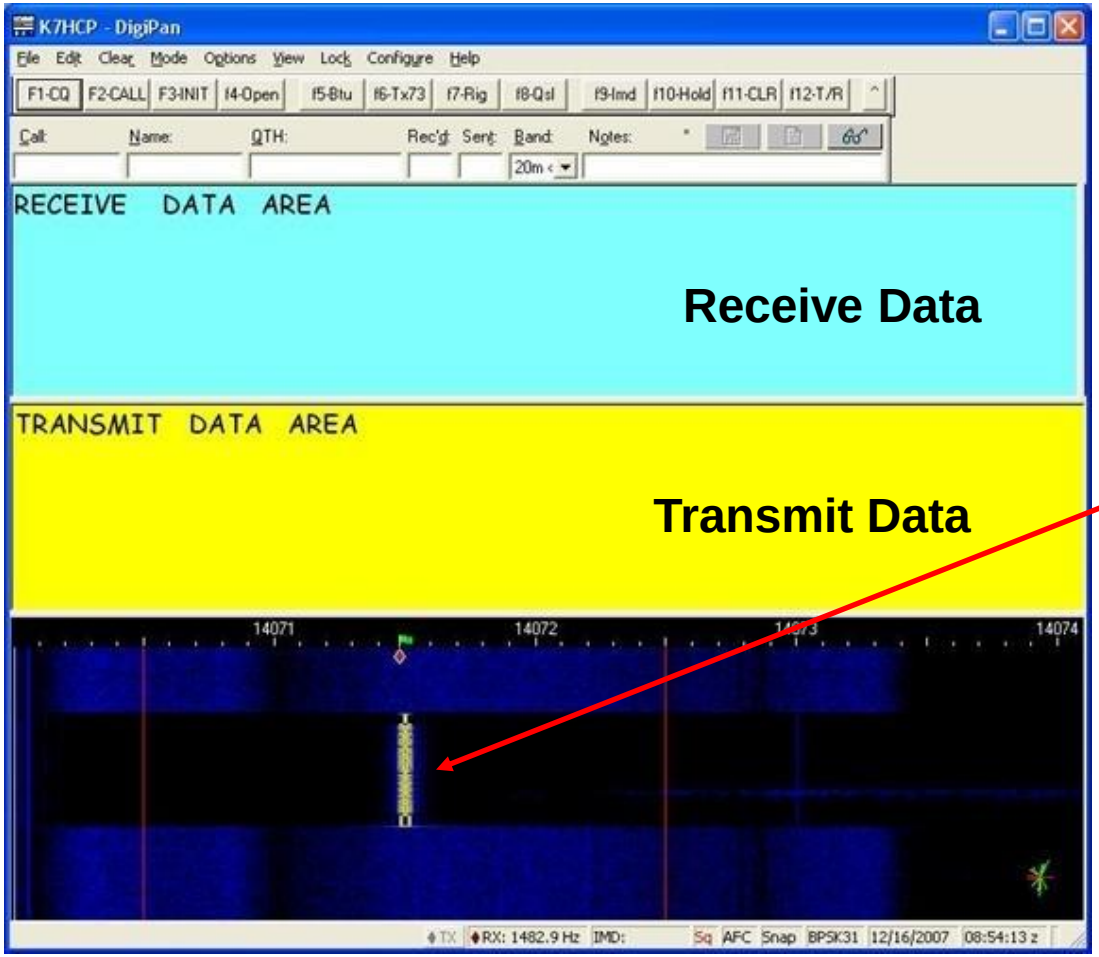
Only 3 common components required

-OR-

USB interface

Digital Mode Interface

PSK31 Screen

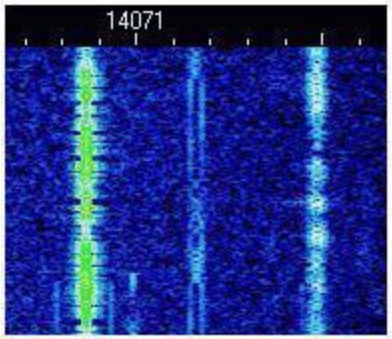


Waterfall Display received signal

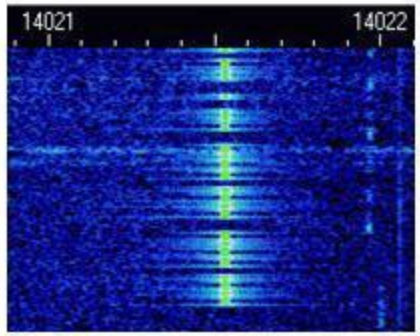
Digital Mode Tuning

Digital hf modes - typical waterfall images

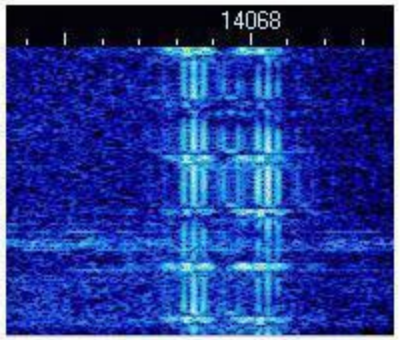
1 Psk31



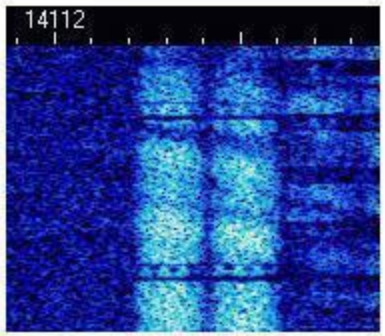
2 Morse CW



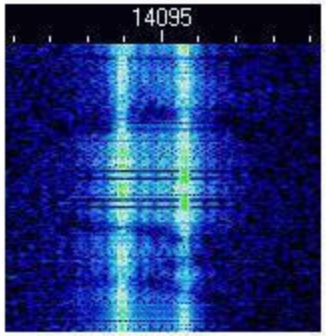
3 Amtor



4 SSTV



5 RTTY

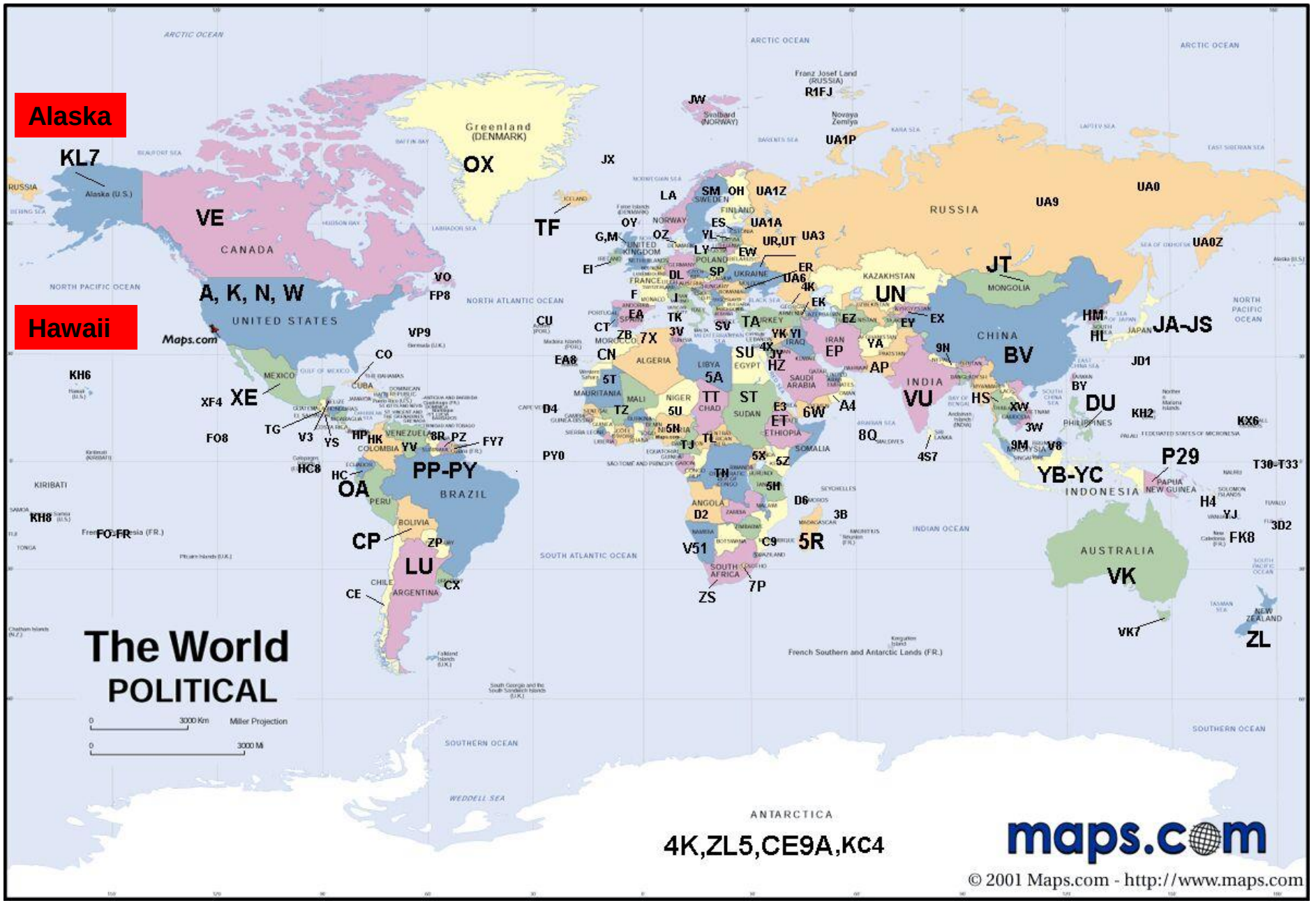


6 Packet

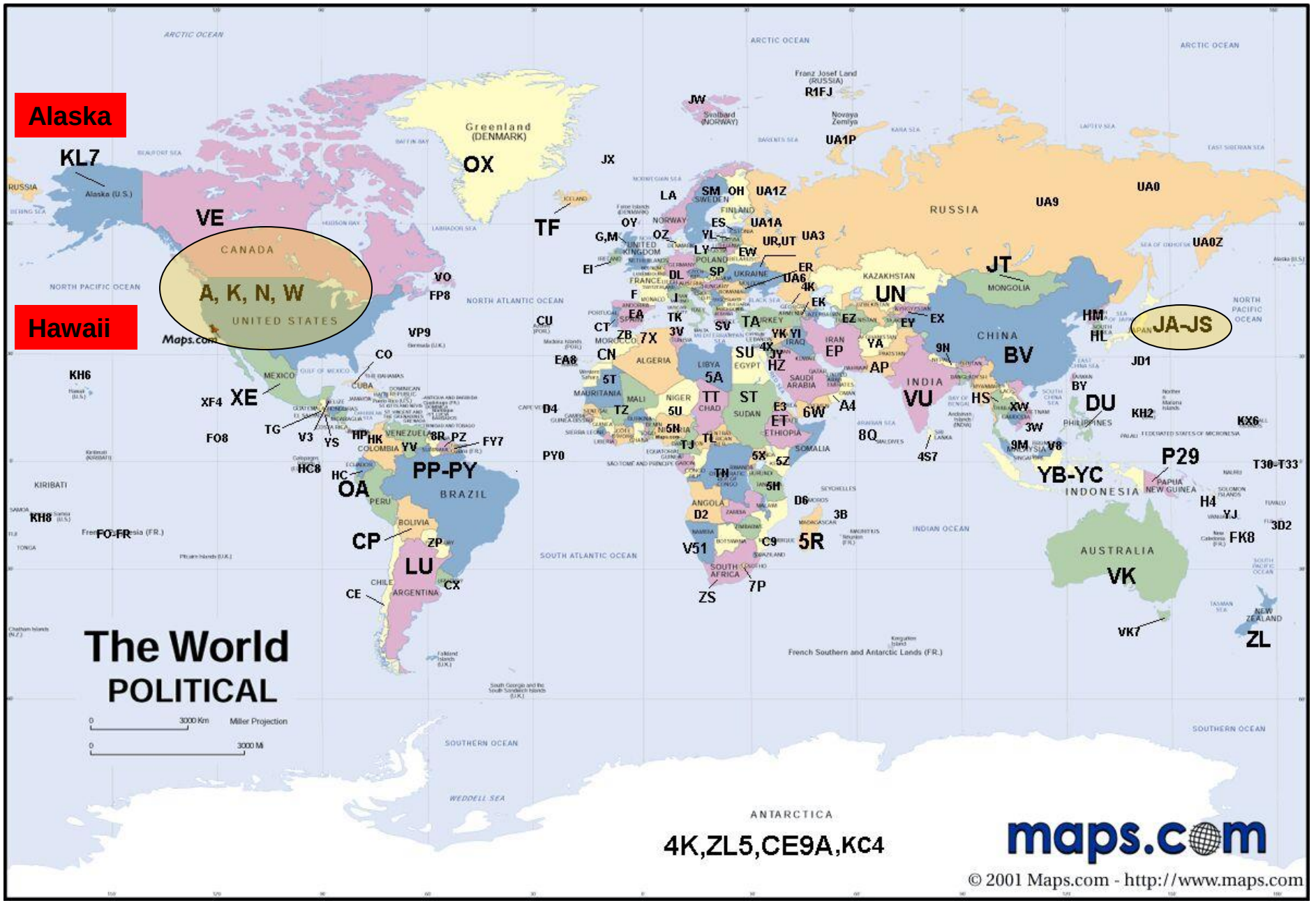
(4) Operating Ham Radio

Call Sign
Prefix's
of the World

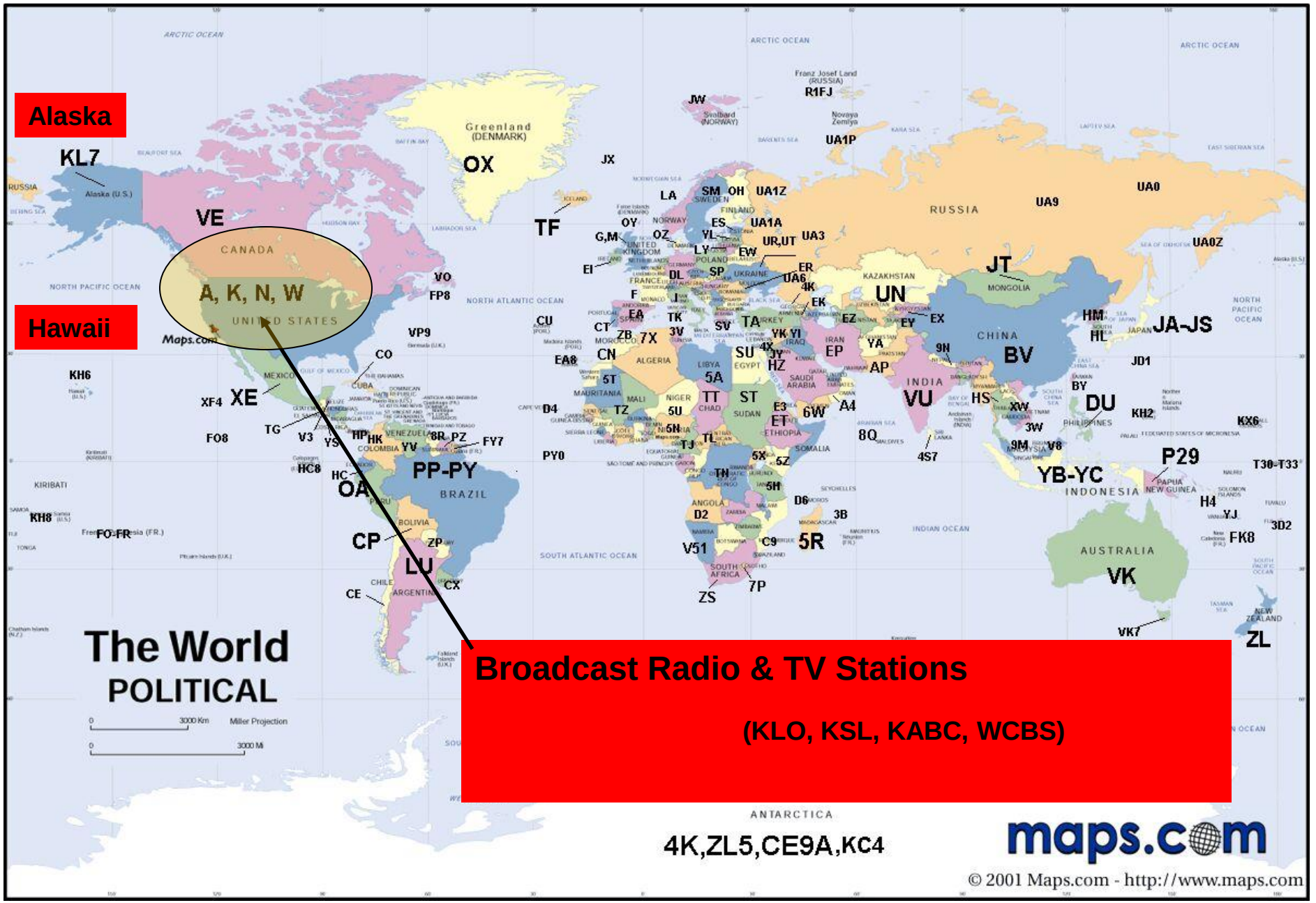
Call Sign Prefix *******



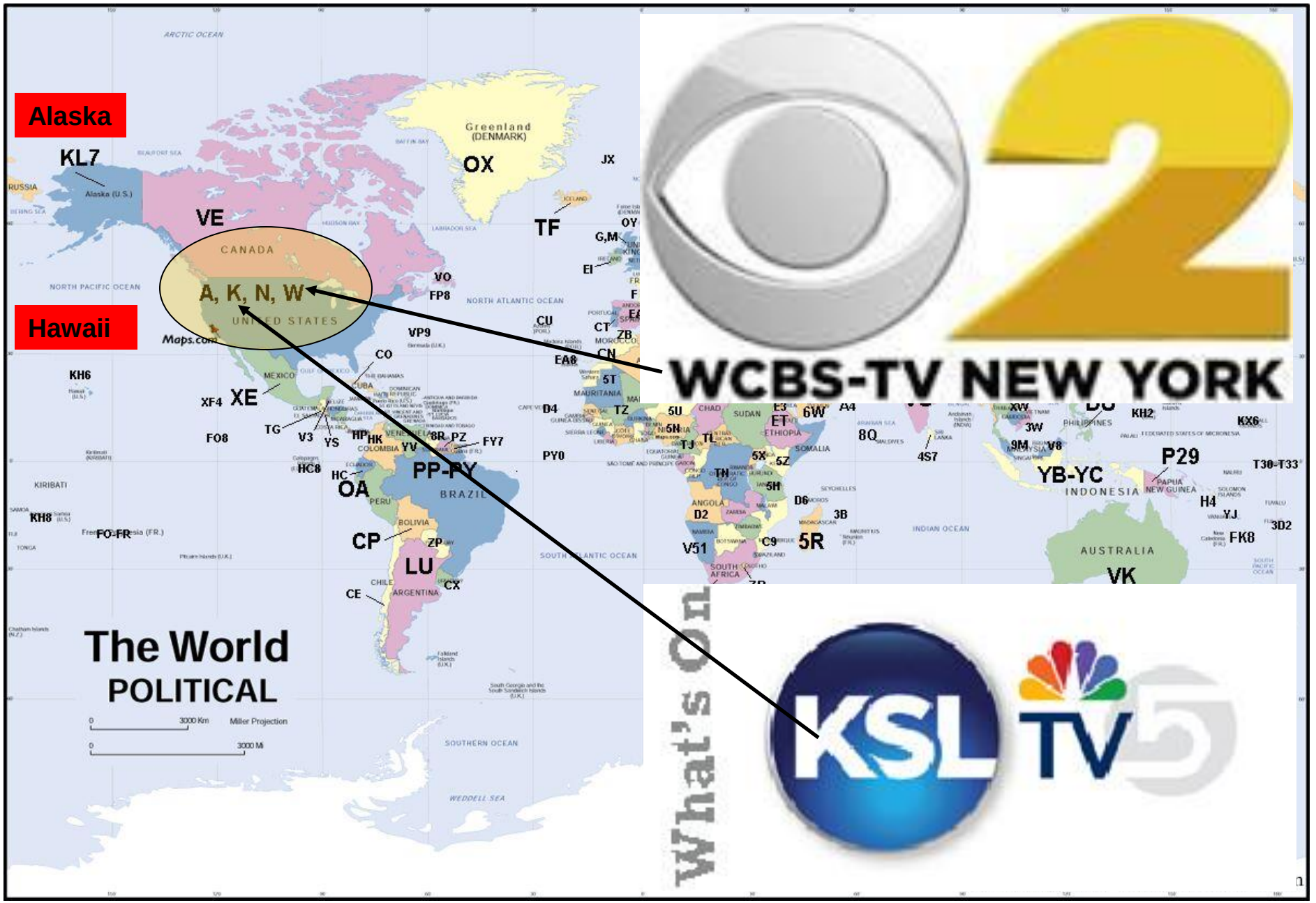
Call Sign Prefix *******



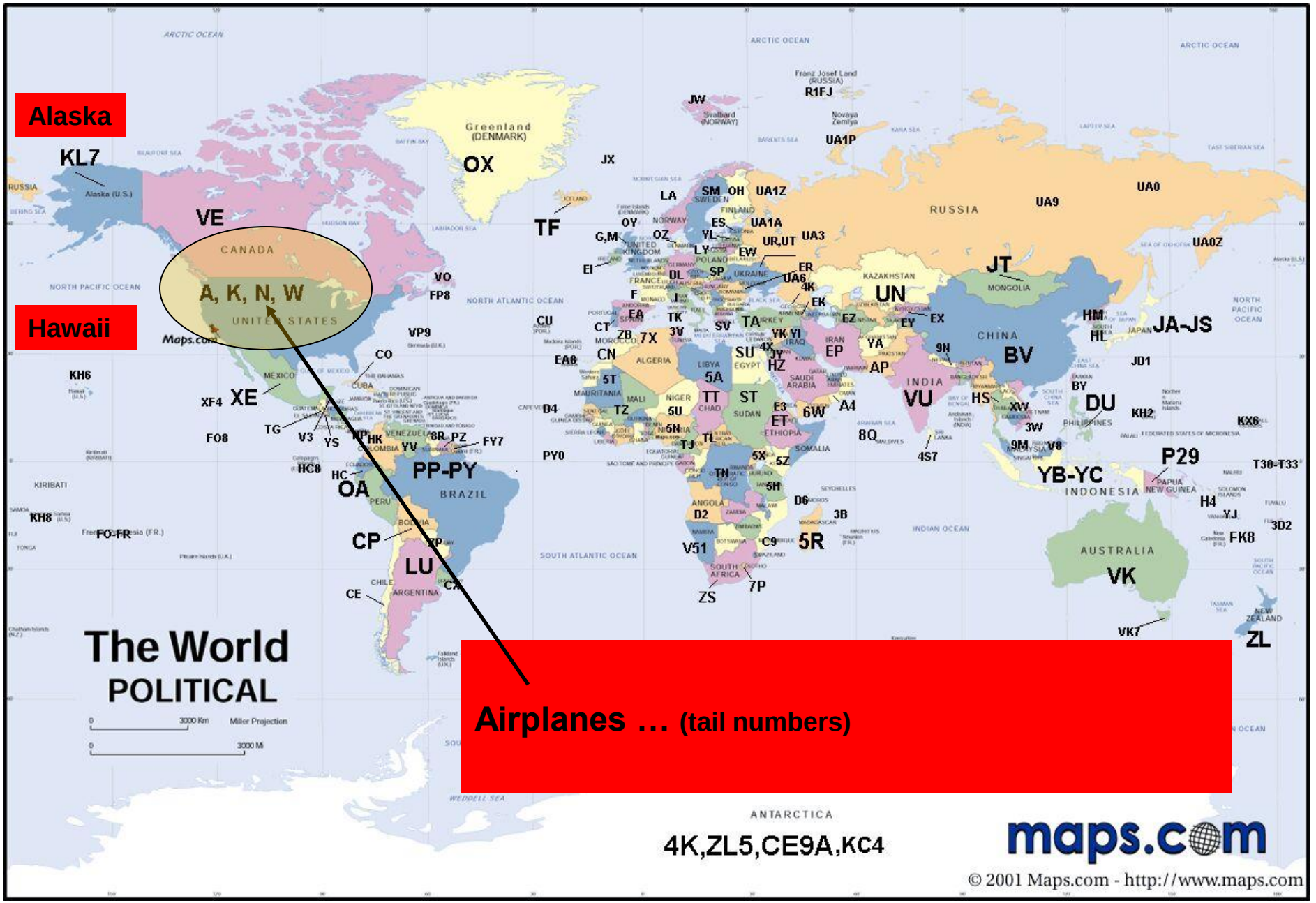
Call Sign Prefix *****



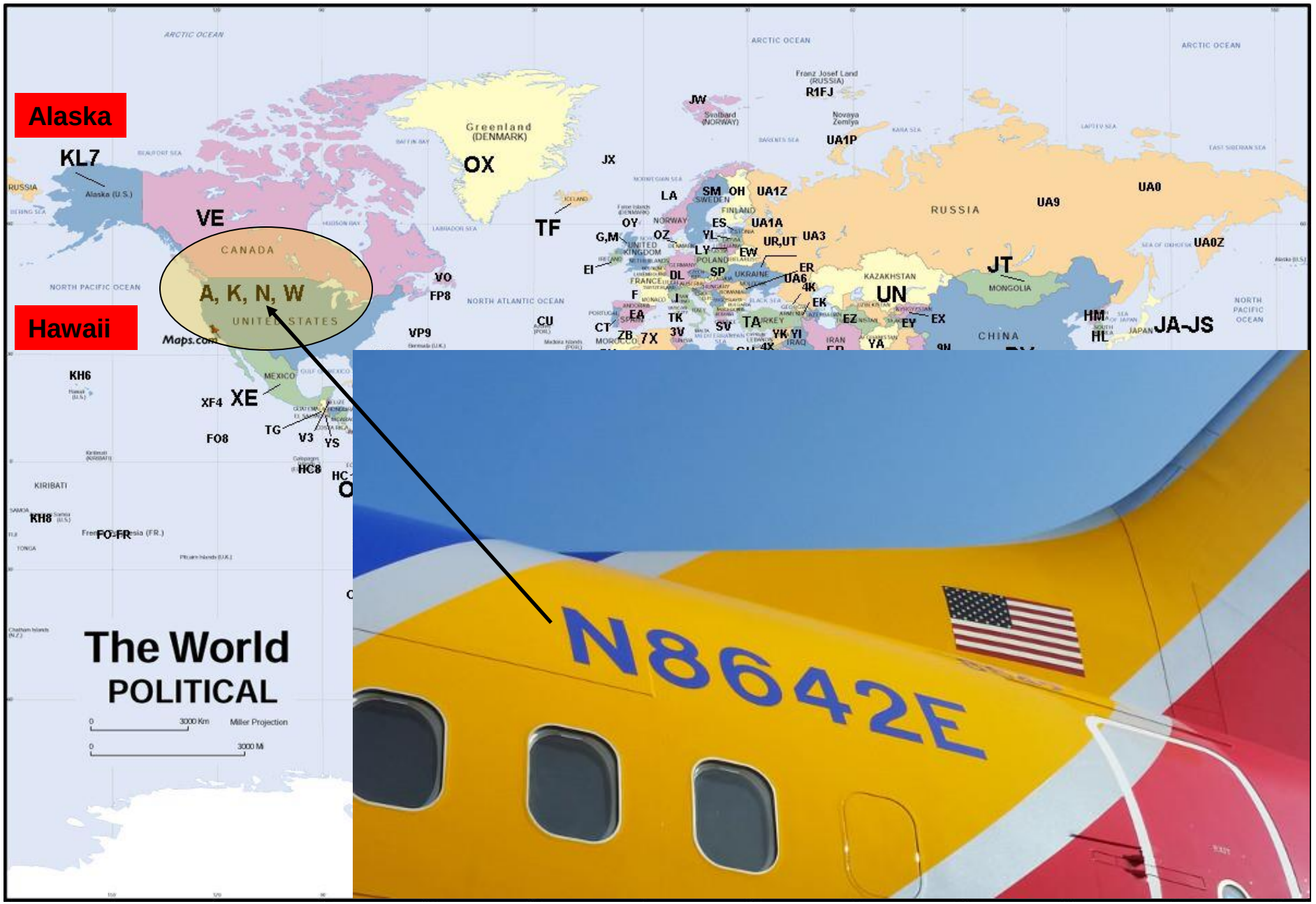
Call Sign Prefix ****



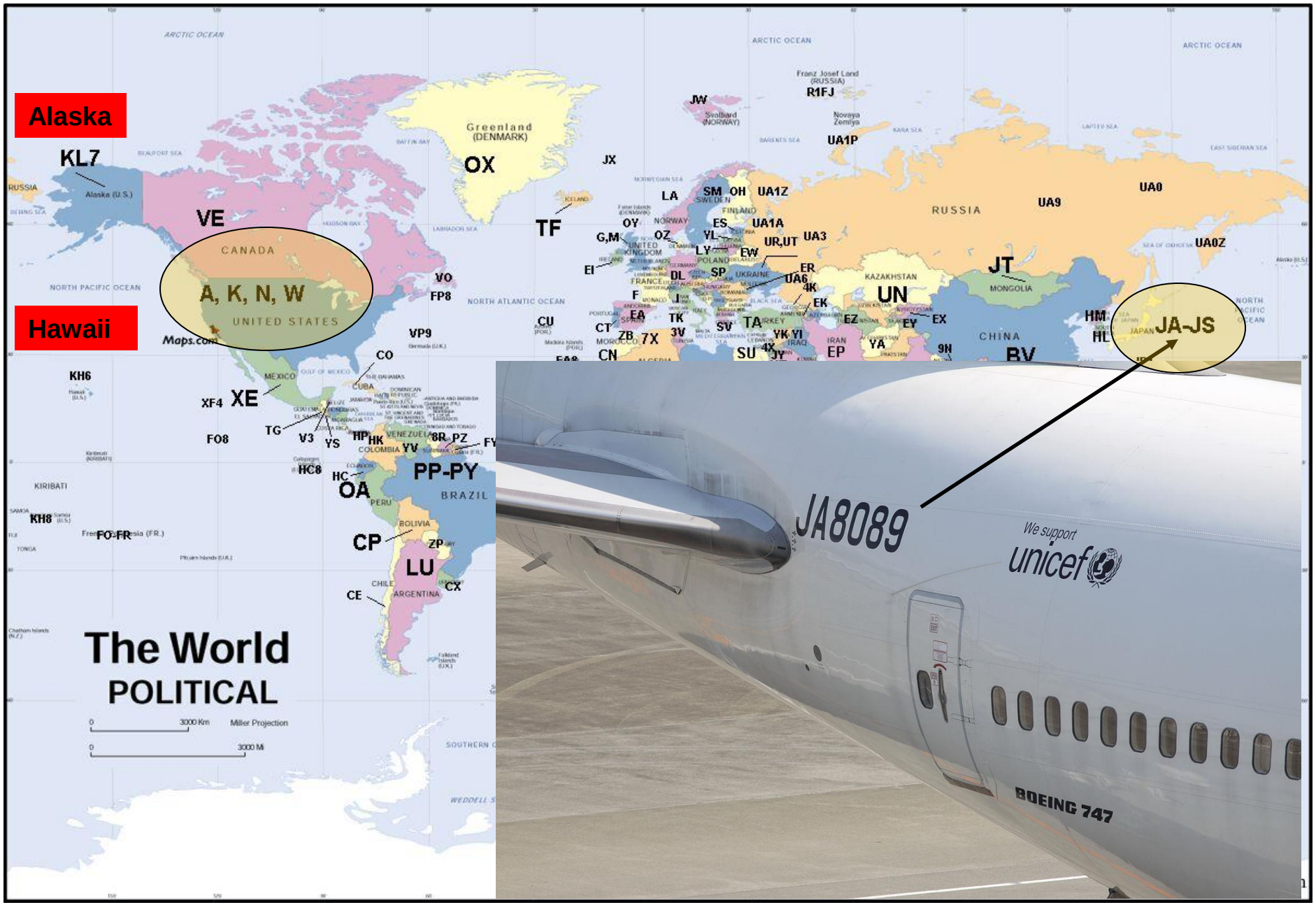
Call Sign Prefix ***



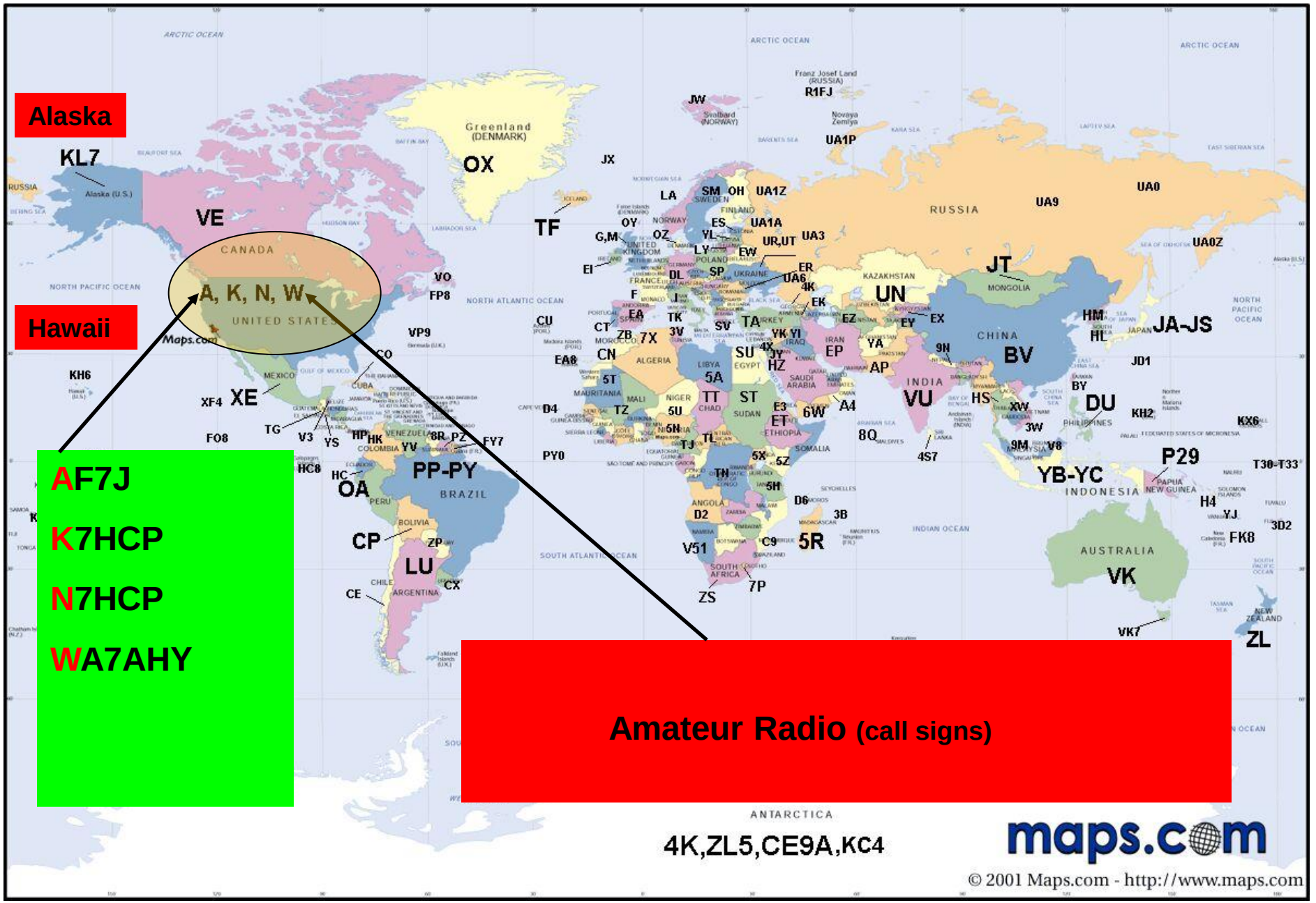
Call Sign Prefix **



Call Sign Prefix **



Call Sign Prefix *



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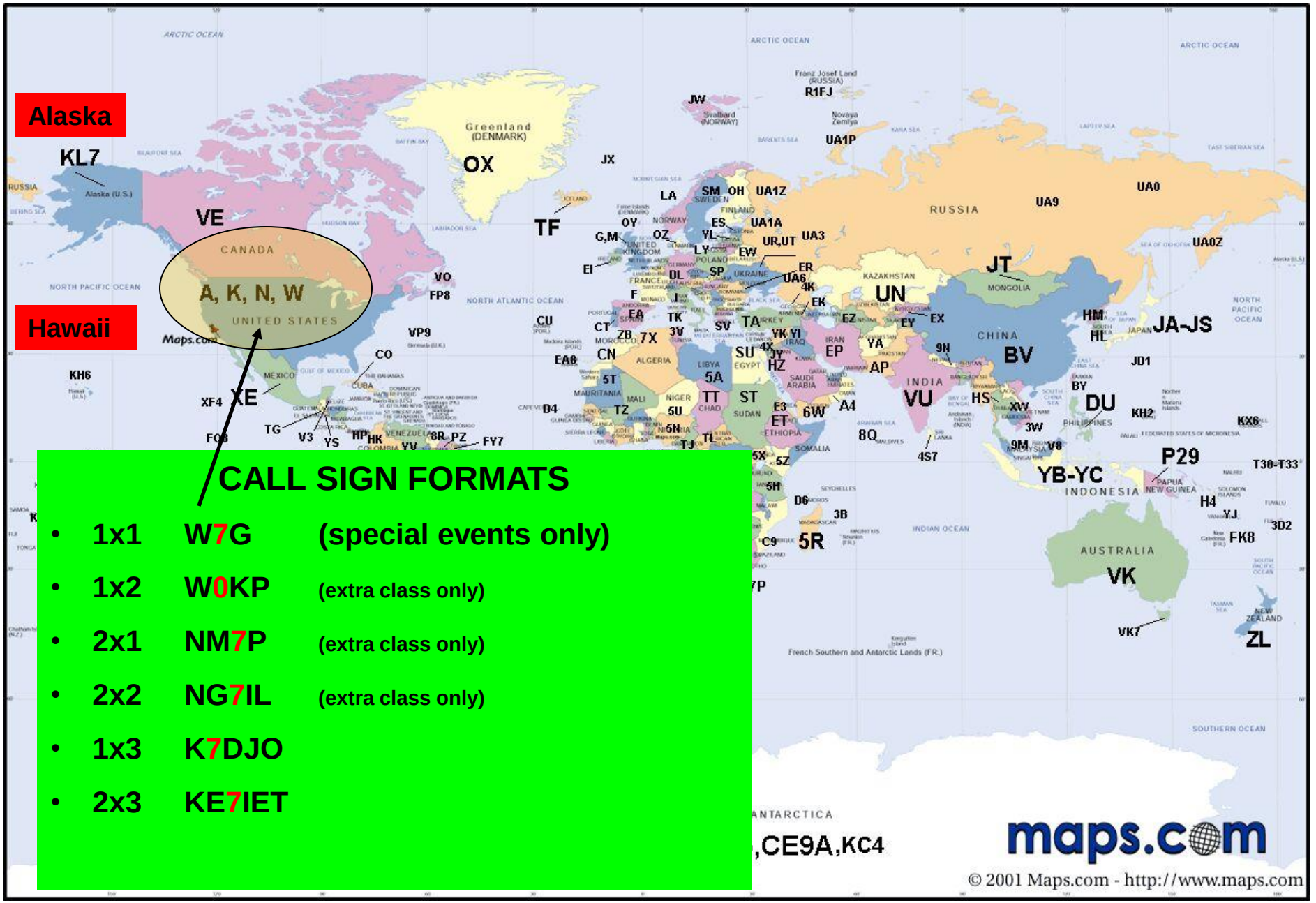
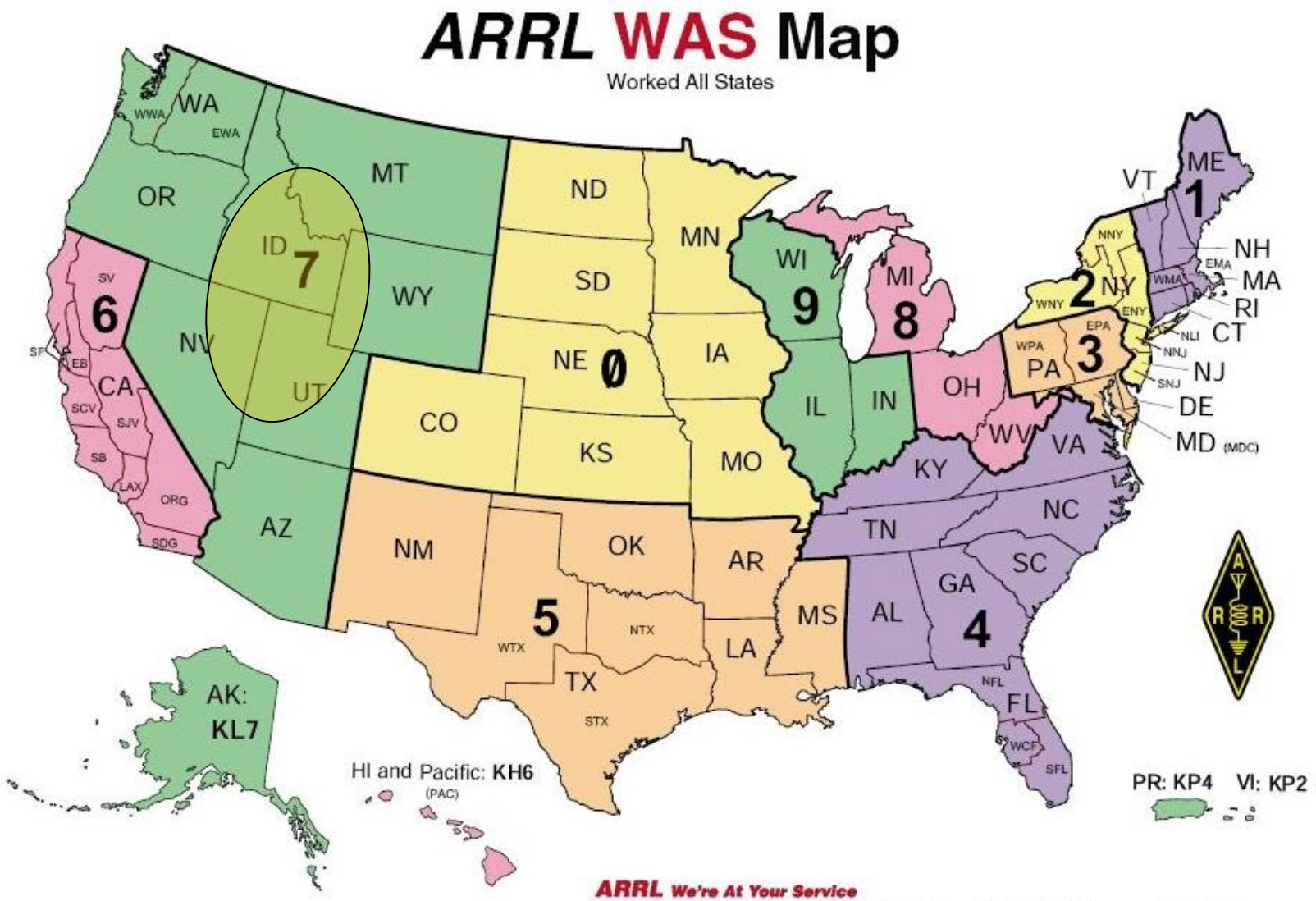


CALL SIGN FORMATS

- 1x1 W7G (special events only)
- 1x2 W0KP (extra class only)
- 2x1 NM7P (extra class only)
- 2x2 NG7IL (extra class only)
- 1x3 K7DJO
- 2x3 KE7IET

Call Sign Areas **



ARRL The national association for AMATEUR RADIO

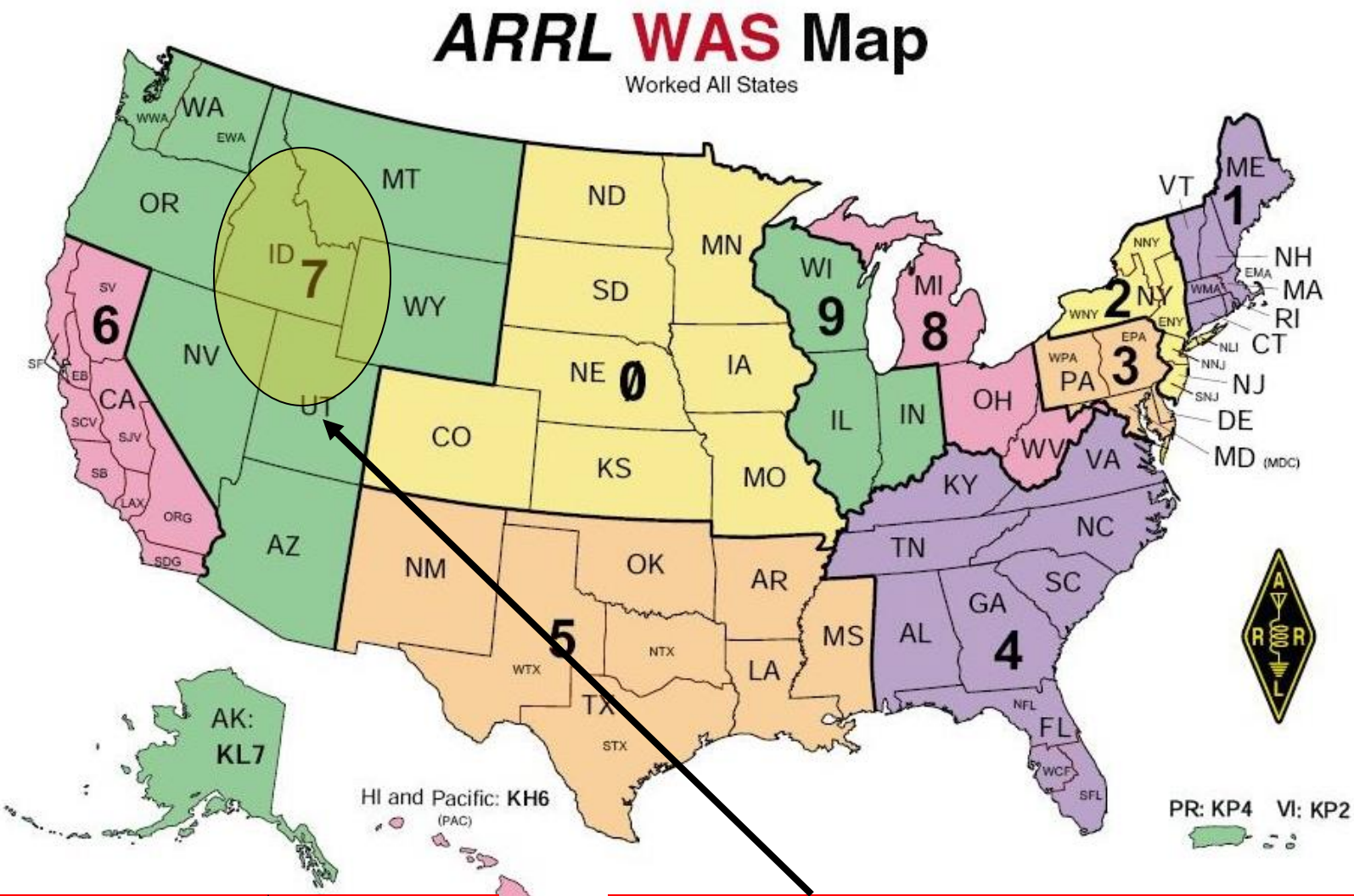
ARRL We're At Your Service

ARRL Headquarters	860-594-0200 (Fax 860-594-0259)	hq@arrl.org
Publication Orders	Toll-Free 1-888-277-5289 (860-594-0355)	orders@arrl.org
Membership/Circulation Desk	Toll-Free 1-888-277-5289 (860-594-0338)	membership@arrl.org
Getting Started in Amateur Radio	Toll-Free 1-800-326-3942 (860-594-0355)	newham@arrl.org
Exams	860-594-0300	vec@arrl.org
ARRL on the World Wide Web	www.arrl.org/	

Call Sign Areas *

Currently issuing >>> KG7Wpp call signs in the 7th call zone area

Call Sign Areas



Apply for a VANITY call sign

Currently issuing >>> KG7Wpp call signs in the 7th area call zone

Vanity Call Signs *

- KO7U (Kim Owen)
- NM7P (Mel Parkes)
- N**G**7**IL** (Gil Leonard)
- N7HCP (Maggi Campbell)

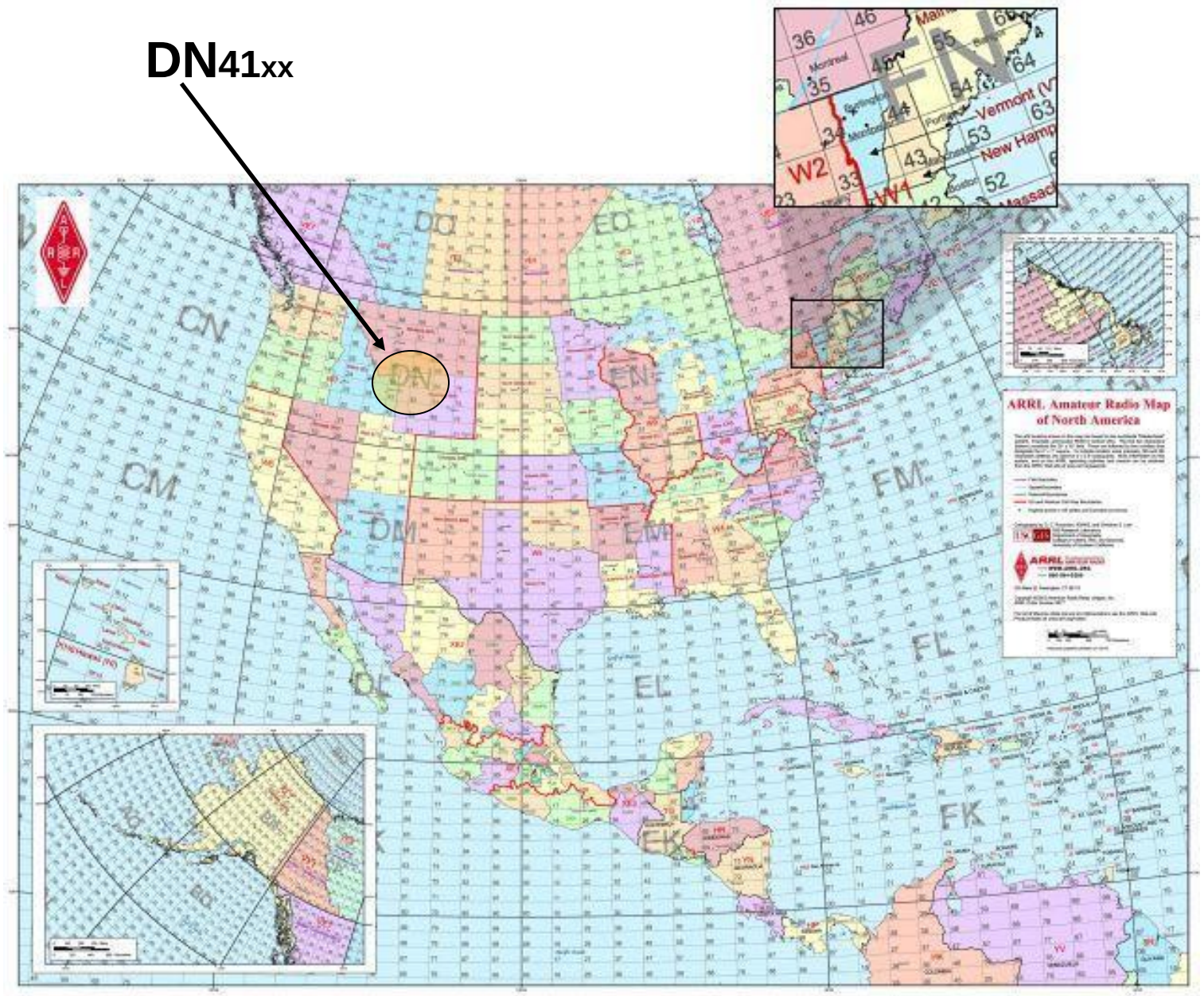
Vanity Call Signs

- KO7U (Kim Owen)
- NM7P (Mel Parkes)
- NG7IL (Gil Leonard)
- N7HCP (Maggi Campbell)

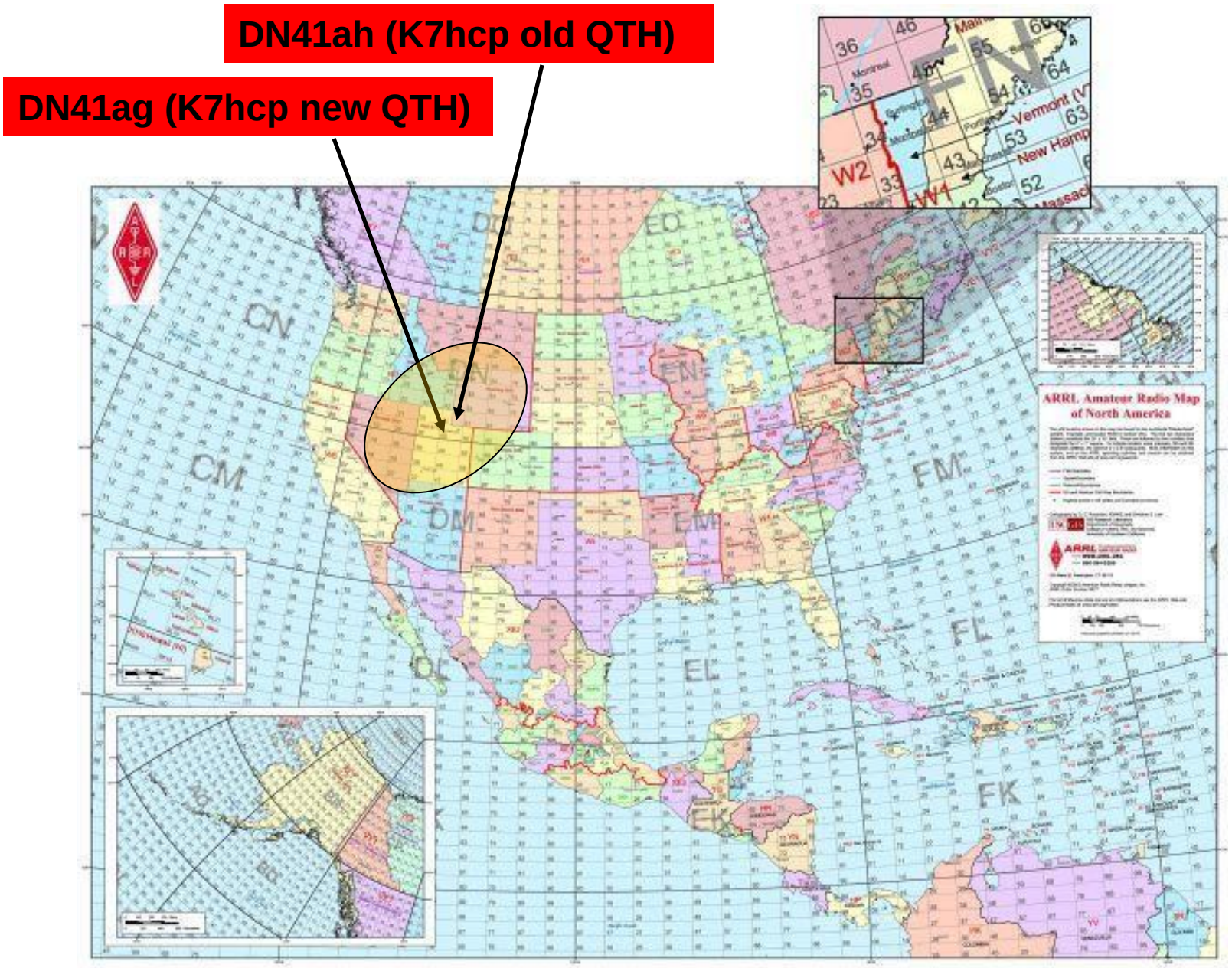
NOTE: FCC Vanity Call Sign fees to be eliminated soon!

Grid Squares of the World

Grid Squares *



Grid Squares

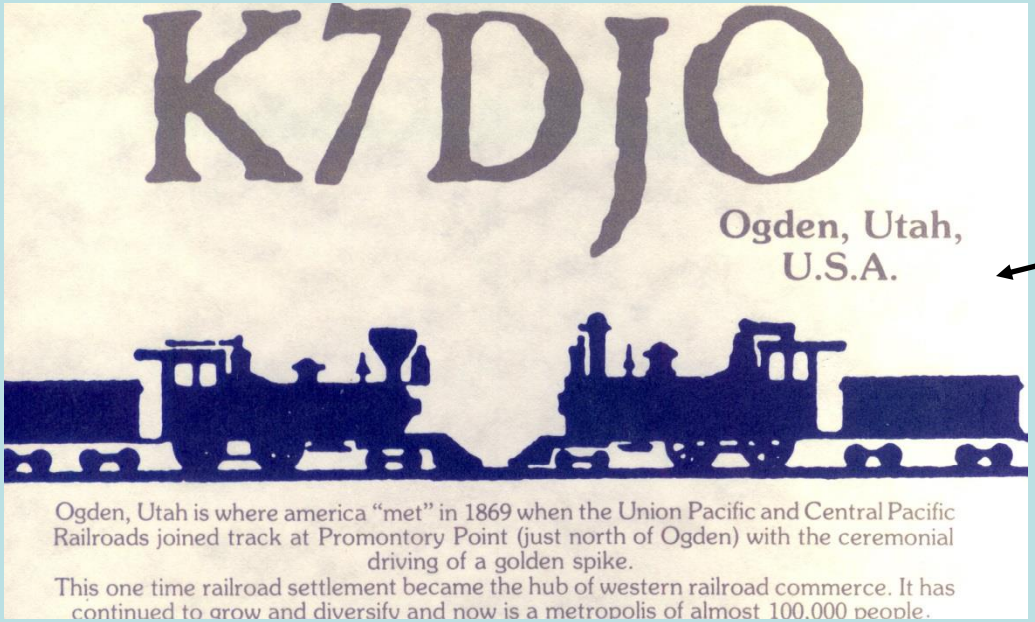


QSL
Cards and Logs

QSL Cards

Single sided QSL card

QSL Cards



Two sided QSL card

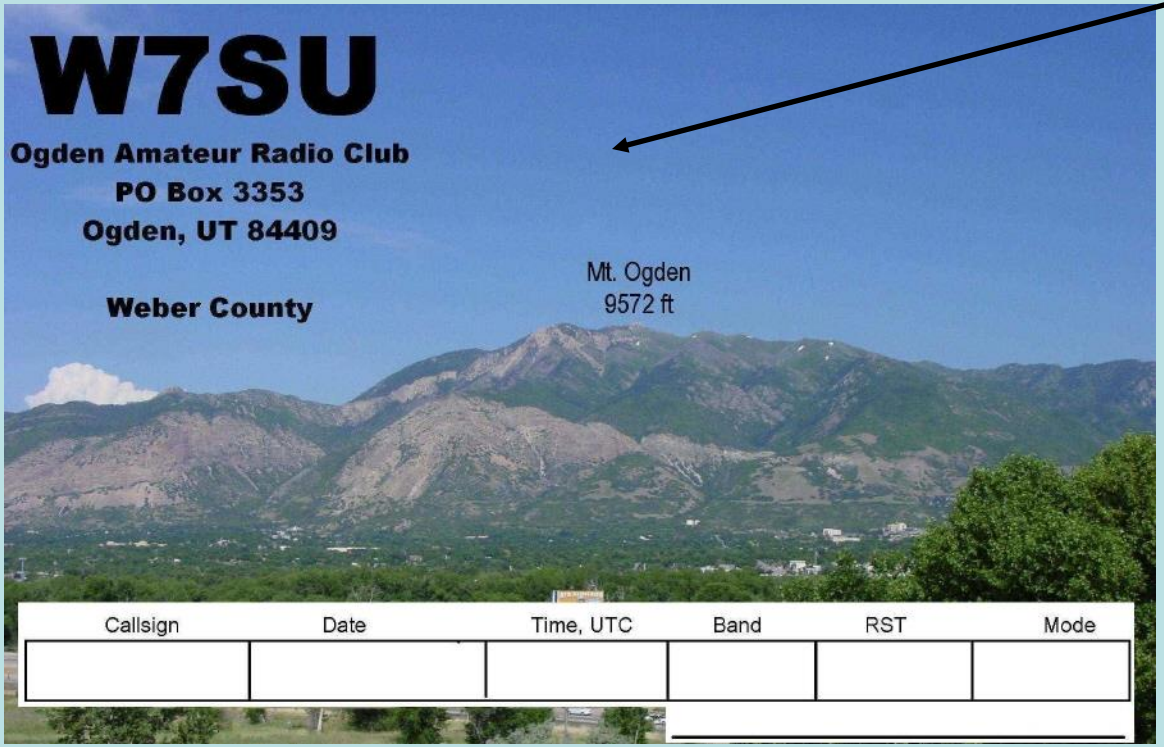
☐ Pse QSL Tnx ☐

John Shupe
4090 Edgehill Dr.
Ogden, Utah, U.S.A.
(Weber County) 84403

Radio .....
Confirming our ..... QSO
Of ..... 19.....
At ..... GMT
Freq. ..... RST .....
Rig. .....

QSL Cards

OARC QSL Card

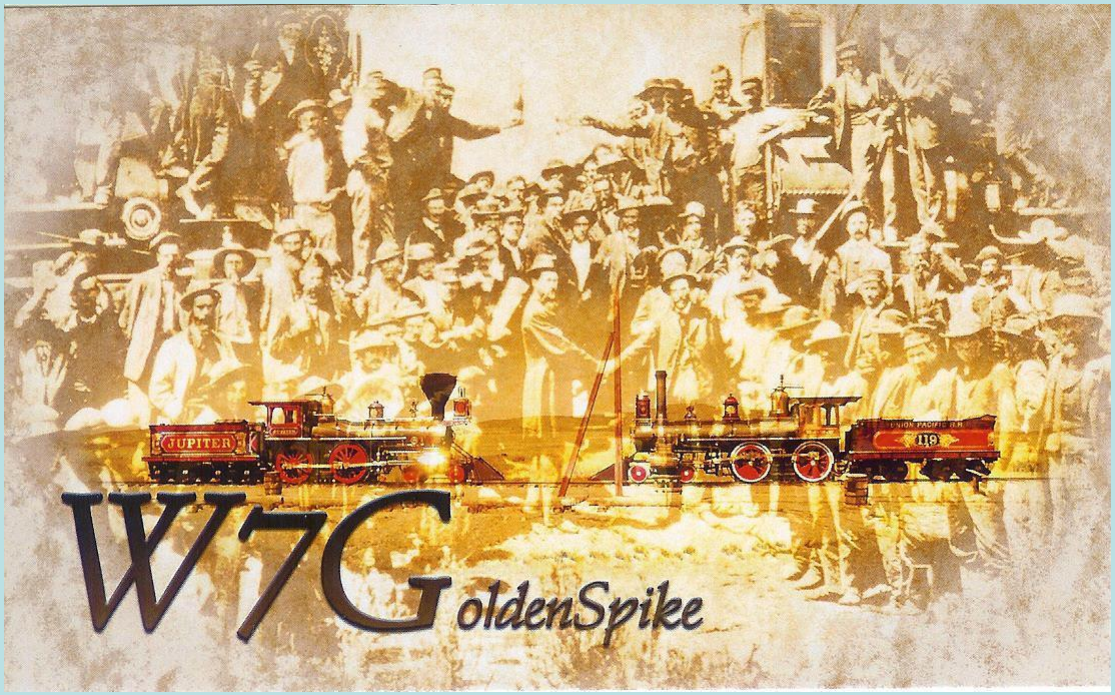


Home made by KZ7O Mike Fullmer

QSL Cards

OARC Special Event QSL Card

“Golden Spike”



QSO LOGS *

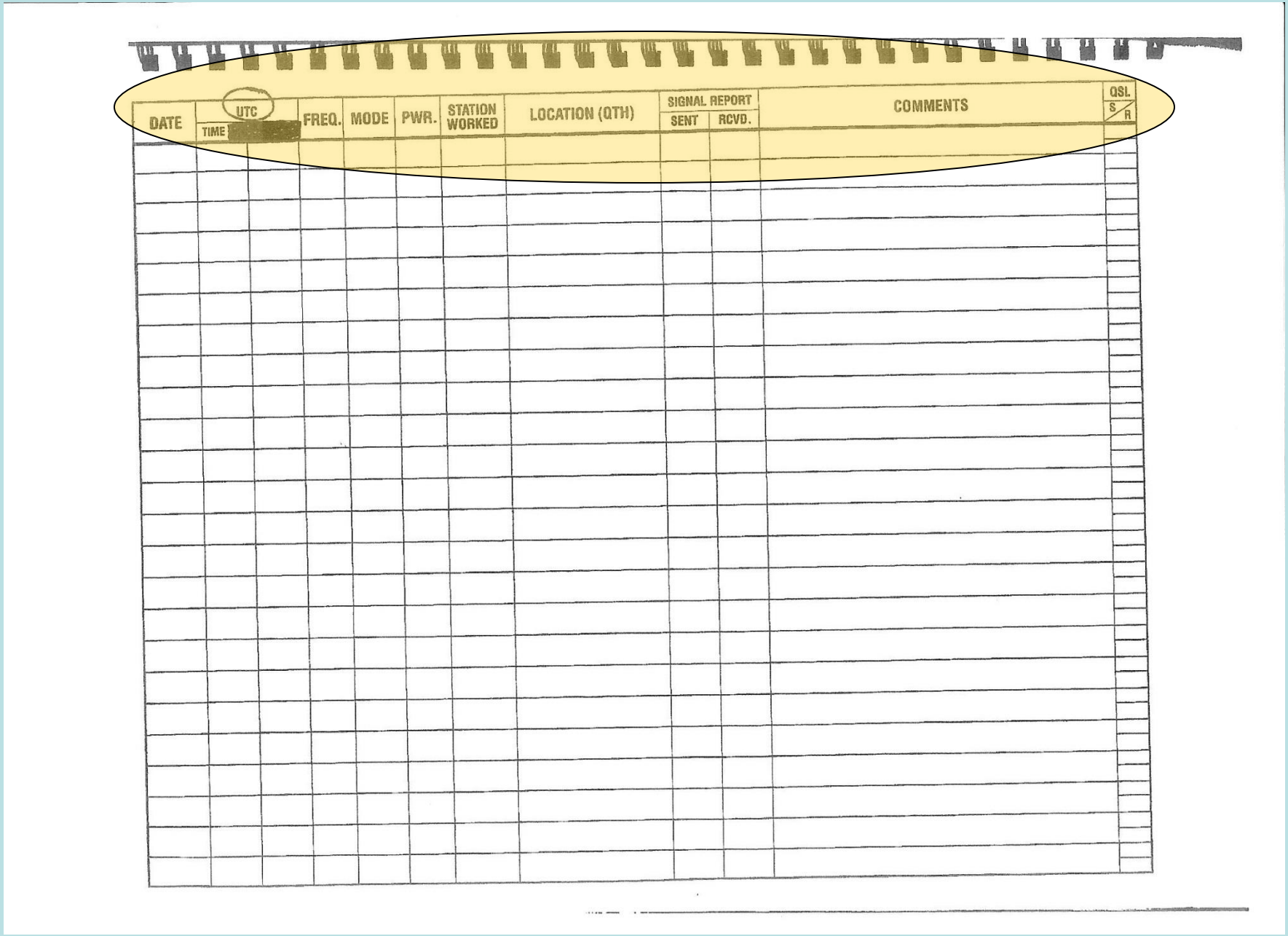
QSO LOGS

Log HF QSO's

+

Manage HF QSL cards

QSO LOGS



DATE	UTC TIME	FREQ.	MODE	PWR.	STATION WORKED	LOCATION (QTH)	SIGNAL REPORT SENT	SIGNAL REPORT RCVD.	COMMENTS	QSL S/R

Awards

ARRL Awards ***

Worked All States

ARRL Awards **

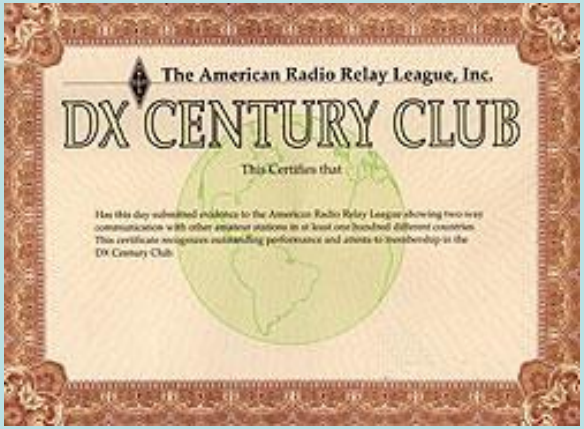
Worked All States

Worked All Continents

ARRL Awards *

Worked All States

Worked All Continents

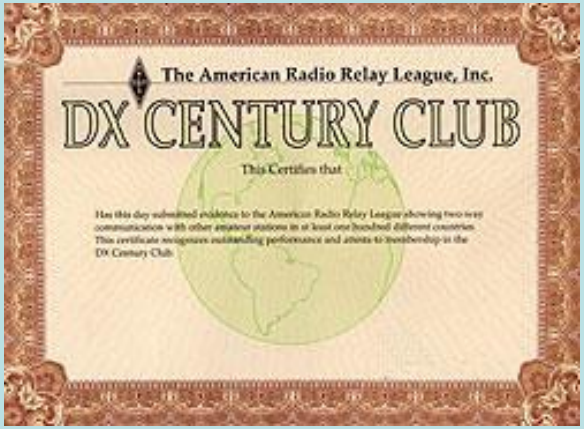


Worked 100 Countries

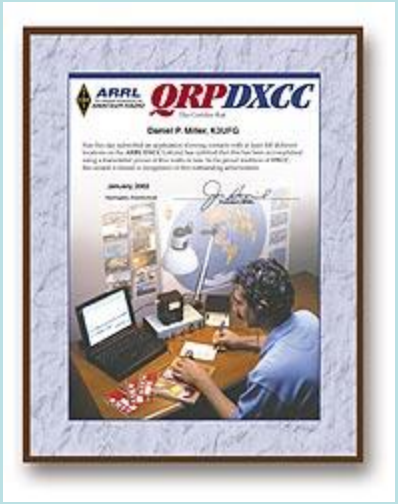
ARRL Awards

Worked All States

Worked All Continents



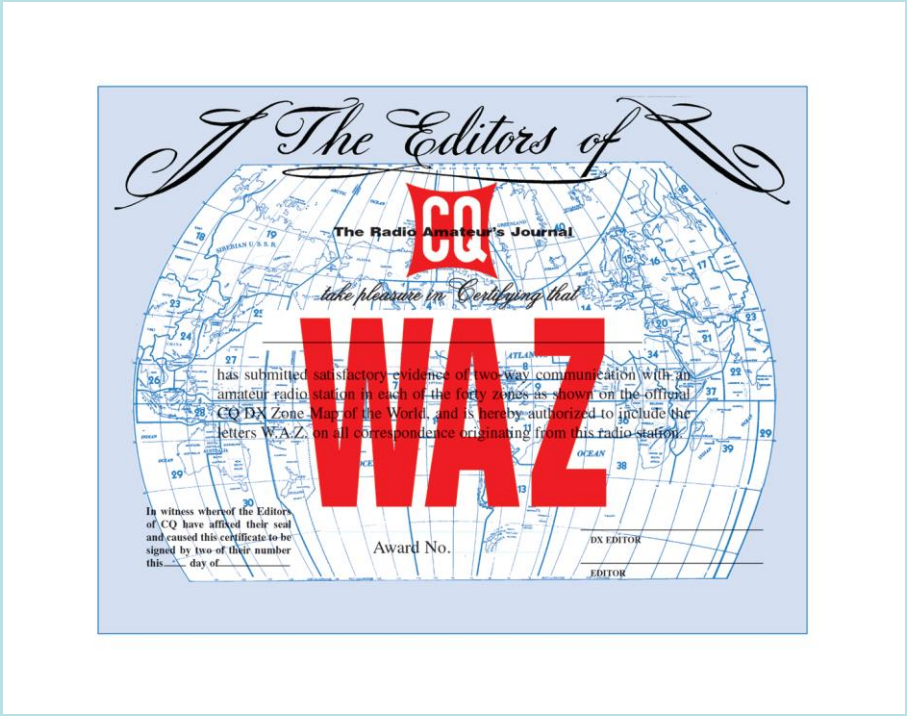
Worked 100 Countries



QRP = low power mode

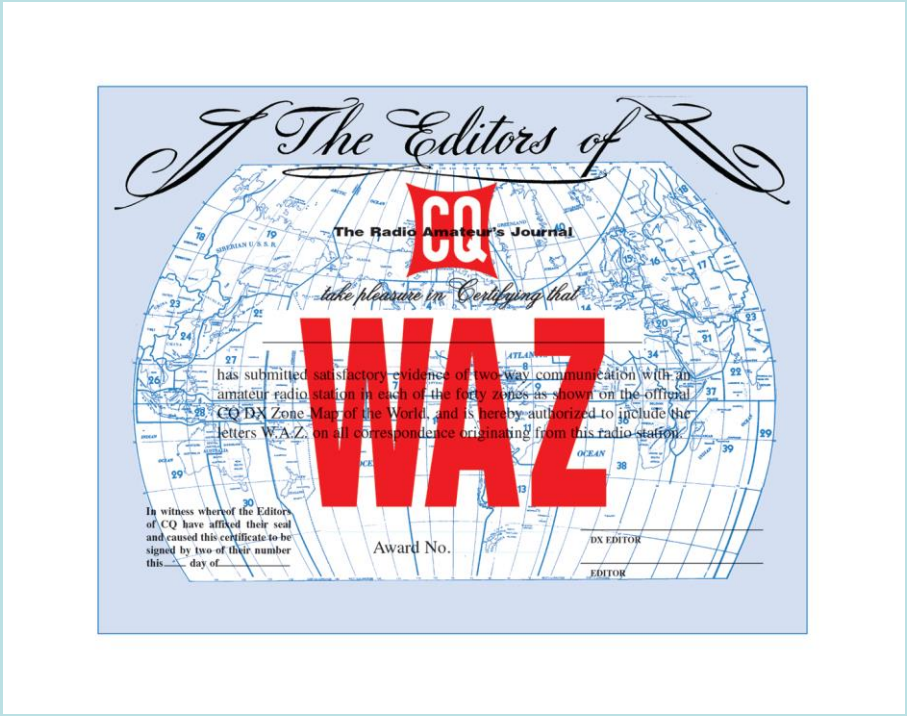
Worked 100 Countries - QRP

CQ Magazine Awards *



CQ Worked All DX Zones

CQ Magazine Awards



CQ Worked All DX Zones

CQ World Wide DX Contest

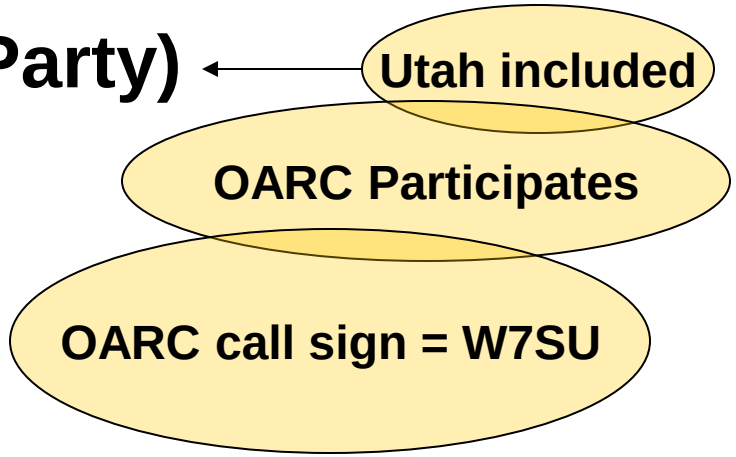
Contests

Contests ***

7QP (7th Area QSO Party)

Contests **

7QP (7th Area QSO Party)



Contests *

7QP (7th Area QSO Party)

Throughout the year…

- **Many other QSO Parties**
- **Various Special Events**

Contests

7QP (7th Area QSO Party)

Throughout the year…

- **Many other QSO Parties**
- **Various Special Events**

Such as…

- **Golden Spike Special Event Station May 10th 2010 sponsored by OARC**

OARC special Golden Spike call sign = W7G

Golden Spike Special Event

ARRL Contests **

- **Field Day (4th Weekend in June)**

OARC call sign = W7SU

ARRL Field Day Event

ARRL Contests *

- **Field Day (4th Weekend in June)**

- **ARRL 10 Meter Contest**
- **ARRL RTTY Roundup**

ARRL Contests

- **Field Day (4th Weekend in June)**

- **ARRL 10 Meter Contest**
- **ARRL RTTY Roundup**

- **International DX Contest - CW**
- **International DX Contest Phone**
- **November Sweepstakes CW**
- **November Sweepstakes Phone**

CQ Magazine Contests

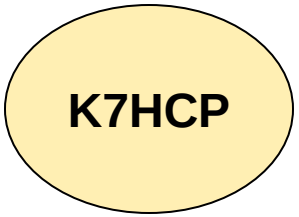
Contest	Month	Weekend	Rules Issue	Results Issue	More info
CQ DX Marathon	Jan – Dec	Full Year	Dec.	TBD	<www.cq-amateur-radio.com>
CQWW 160 Meter / CW	Jan	Last full weekend	Dec.	Dec.	<www.cq-amateur-radio.com>
CQWW RTTY WPX	Feb	2nd full weekend	Jan.	Jul.	<www.cq-amateur-radio.com>
CQWW 160 Meter / SSB	Feb	Last full weekend	Dec.	Dec.	<www.cq-amateur-radio.com>
CQWW WPX / SSB	Mar	Last full weekend	Feb.	Jan.	<www.cqwpx.com>
CQ National Foxhunting Weekend	May	2nd or 3rd full weekend (see rules)	Apr.	Apr.	<www.homingin.com>
CQWW WPX / CW	May	Last full weekend	Feb.	Mar.	<www.cqwpx.com>
CQWW VHF	July	3rd full weekend	Jun.	Apr.	<www.cq-amateur-radio.com>
CQWW RTTY DX	Sept	4th full weekend	Jul.	May	<www.cq-amateur-radio.com>
CQWW DX / SSB	Oct	Last full weekend	Sep.	Aug.	<www.cqww.com>
CQWW DX / CW	Nov	Last full weekend	Sep.	Sep.	<www.cqww.com>

Memberships
(SIG's)
Special Interest Groups

Memberships *

SSB

- **Ten-Ten # 39694**
  - Ten Meters International Net
- **ISSB # 6268**
  - International Single Sideband System
- **OMISS # 2078**
  - Old Man International Sideband Society



Val Campbell

Memberships

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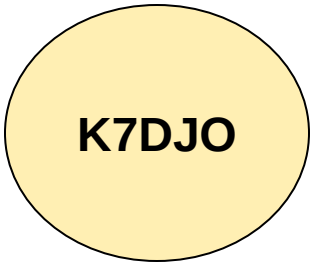
CW

- **FISTS # 14614**
  - International Morse Preservation Society
- **SKCC # 5905**
  - Straight Key Century Club
- **QCWA # 34920**
  - Quarter Century Wireless Association
- **NAQCC # 4012**
  - North America QRP CW Club



John Shupe

Nets

HF Nets **

– Utah Beehive Net	7272 Khz
– Utah CW Code Net	3570 Khz
– Utah Farm Net	3937 Khz
– Utah Old Timers Net	7193 Khz
– Utah RACES Net	3920 Khz
– QCWA Net	7272 Khz
– 6 Meters SSB Net	50.125 Mhz
– No Utah 10 meter Net	28.313 Mhz

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– Century Net	(www.3905ccn.com)
– ISSB-YL Net	(www.qsl.net/yl-issb)
– OMISS Net	(www.omiss.net)
– Ten-Ten Net	(www.ten-ten.org)
– Triple H Net	(www.hhhnet.net)
– W1AW	(www.arrl.net)

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Phonetic Alphabet

Phonetic Alphabet *

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

Phonetic Alphabet

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	Y	Yankee
	Z	Zulu

K7HCP = Kilo 7 Hotel Charlie Papa

“Q” Signals and Procedures

“Q” Signals *

Communications “Shortcut” Terms

“Q” Signal	Meaning
QRM	Interference (man made)
QRN	Interference (natural)
QRP	Low Power (5 watts or less)
QRS	Slow CW
QSL	Confirmation/Exchange
QSO	Contact
QST	Bulletin

“Q” Signals + More

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Other Signals	Meaning
CQ	General Call
DX	Long Distance
73	Best Regards

CW Operating Procedures *

ARRL CW Communications Procedures

Voice	Code	Situation
General call	CQ	Used to solicit communications.
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
From -or- "this is"	DE	Shortcut meaning "from" or this is.
Go ahead (specific)	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.
Best Regards	73	Used at the end of QSO to bid them farewell.

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CQ CQ CQ

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RST Signal System **

Readability

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

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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.

Fone: 5-9 = perfect

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8 Strong signals.
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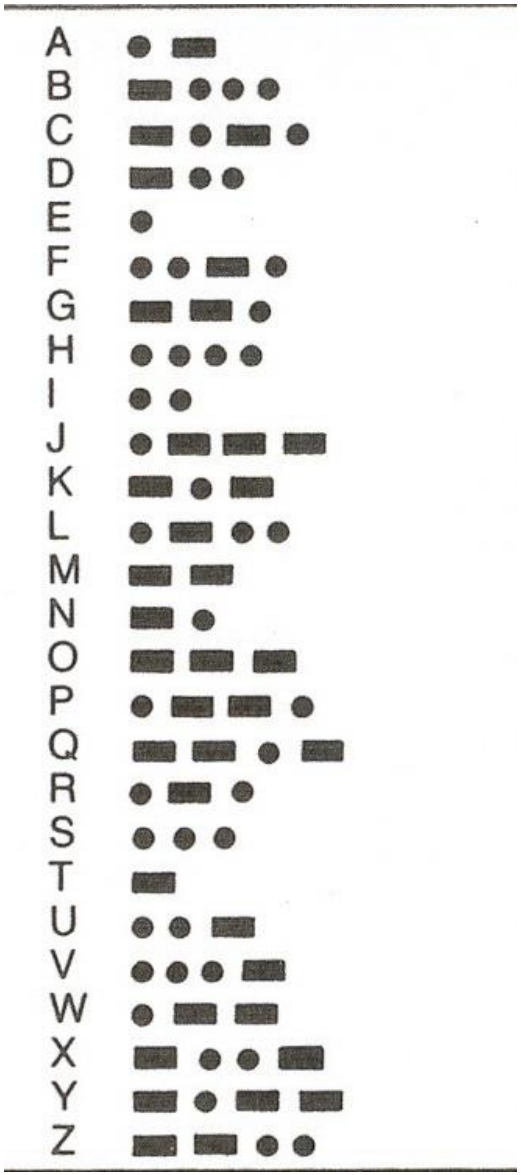
CW: 5-9-9 = perfect

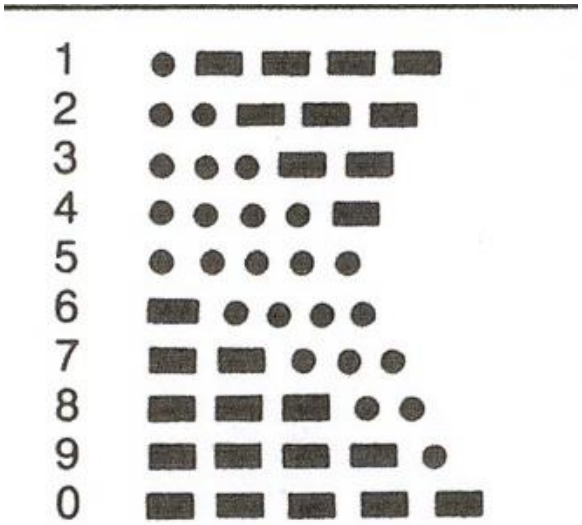
Tone (cw only)

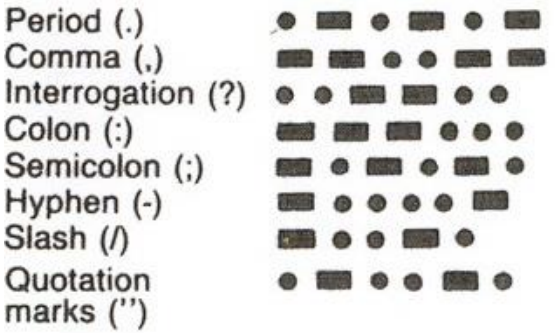
1 Sixty cycle a.c or less, very rough and broad.
2 Very rough a.c., very harsh and broad.
3 Rough a.c. tone, rectified but not filtered.
4 Rough note, some trace of filtering.
5 Filtered rectified a.c. but strongly ripple-modulated.
6 Filtered tone, definite trace of ripple modulation.
7 Near pure tone,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

Morse Code

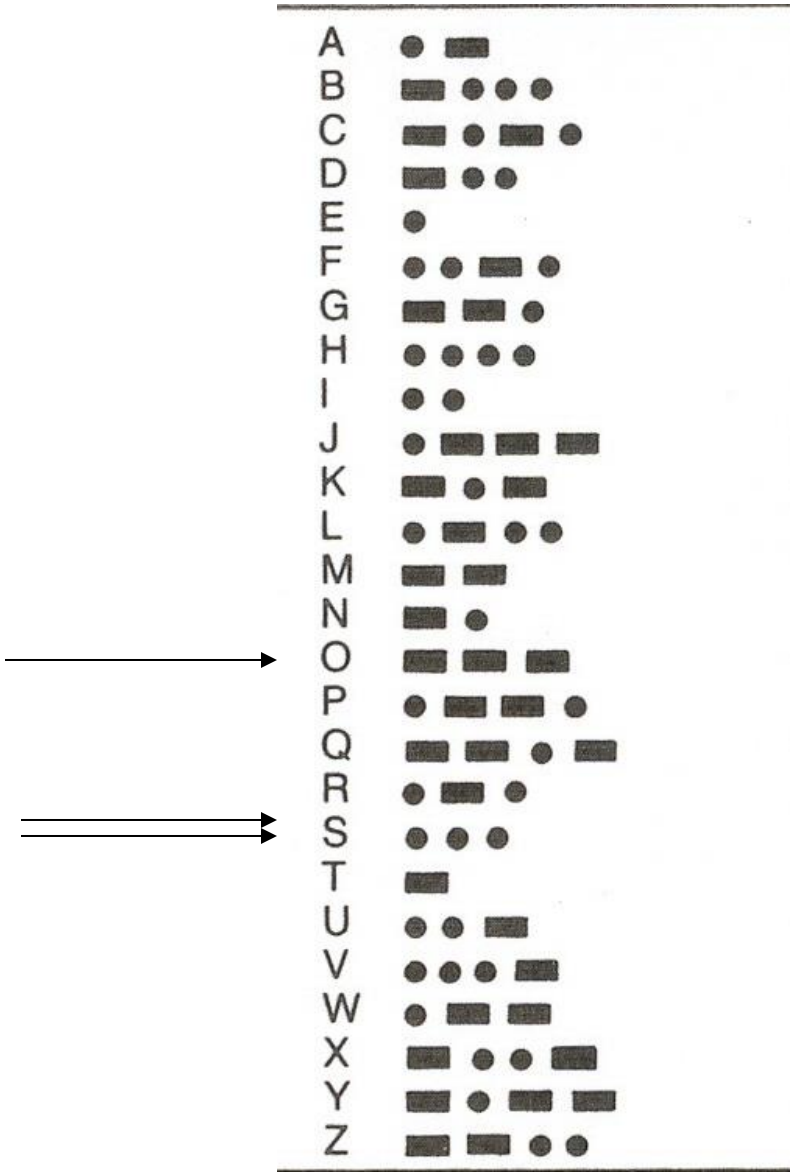
International Morse Code *

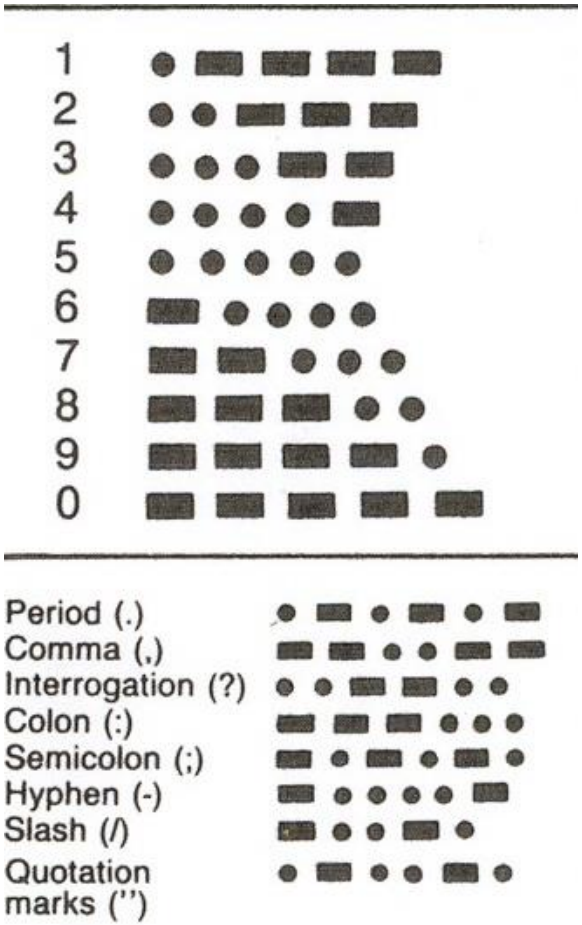






International Morse Code





Learn code by sound not by sight

S O S

Universal
Time
Coordinated

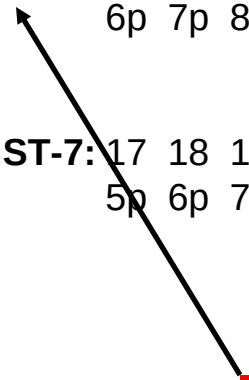
“UTC” or “GMT” or Zulu

Universal Time Conversion Chart ***

UTC::	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
MDT-6:	18	19	20	21	22	23	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17
	6p	7p	8p	9p	10	11	12	1a	2a	3a	4a	5a	6a	7a	8a	9a	10	11	12	1p	2p	3p	4p	5p
MST-7:	17	18	19	20	21	22	23	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16
	5p	6p	7p	8p	9p	10	11	12	1a	2a	3a	4a	5a	6a	7a	8a	9a	10	11	12	1p	2p	3p	4p

Universal Time (Zulu) Conversion Chart **

UTC::	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
MDT-6:	18	19	20	21	22	23	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17
	6p	7p	8p	9p	10	11	12	1a	2a	3a	4a	5a	6a	7a	8a	9a	10	11	12	1p	2p	3p	4p	5p
MST-7:	17	18	19	20	21	22	23	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16
	5p	6p	7p	8p	9p	10	11	12	1a	2a	3a	4a	5a	6a	7a	8a	9a	10	11	12	1p	2p	3p	4p



Summer: Daylight savings time (utc-6)

Universal Time (Zulu) Conversion Chart *

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MDT-6:	18	19	20	21	22	23	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17
	6p	7p	8p	9p	10	11	12	1a	2a	3a	4a	5a	6a	7a	8a	9a	10	11	12	1p	2p	3p	4p	5p
MST-7:	17	18	19	20	21	22	23	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16
	5p	6p	7p	8p	9p	10	11	12	1a	2a	3a	4a	5a	6a	7a	8a	9a	10	11	12	1p	2p	3p	4p

Summer: Daylight savings time (utc-6)

Winter: Standard time (utc-7)

Universal Time (Zulu) Conversion Chart

UTC::	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
MDT-6:	18	19	20	21	22	23	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17
	6p	7p	8p	9p	10	11	12	1a	2a	3a	4a	5a	6a	7a	8a	9a	10	11	12	1p	2p	3p	4p	5p
MST-7:	17	18	19	20	21	22	23	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16
	5p	6p	7p	8p	9p	10	11	12	1a	2a	3a	4a	5a	6a	7a	8a	9a	10	11	12	1p	2p	3p	4p

Summer: Daylight savings time

Winter: Standard time

Example: 18:00 UTC = 11:00 am Mtn Std time or Noon Mtn Daylight time

A few QSO's

Let's listen in

HF SSB QSO's

1
Domestic QSO

2
Japanese Ham

3
DX Pileup

4
Spanish QSO

(5) Ham Radio Equipment

Transceivers

HF Transceivers *

OARC – Field Day Operations

OARC Station #1

Yaesu FT890 HF (100 watt)
Solid State technology 1990's
circa 1990 New $1500

HF Transceivers

OARC – Field Day Operations

OARC Station #1

Yaesu FT890 HF (100 watt)
Solid State technology 1990's
circa 1990 New $1500

Icom IC-718 HF (100 watt)
w/o tuner, w/o keyer
circa 2000 New $600
(donated to OARC)

OARC Station #2

HF Transceivers *

QRP – Low Power

K7DJO
John Shupe

Ten-Tec 1330 Mono-band
QRP CW (3 watt) Kit $119

HF Transceivers

QRP – Low Power

K7DJO
John Shupe

Ten-Tec 1330 Mono-ban
QRP CW (3 watt) Kit $119

Kenwood TS-480 (100 watt)
w/ tuner, w/ keyer New $1000

HF Transceivers *

EleCraft K2 (10 or 100 watt)
Kit $699 up

KD7PAW
Jeff Anderson

HF Transceivers

KD7PAW
Jeff Anderson

EleCraft K2 (10 or 100 watt)
Kit $699 up

Icom IC-703 HF QRP (10 watt)
multi-mode, w/ tuner, w/ keyer
New $499

K7JSC
James Clarke

HF Transceivers

w/ General coverage receivers

Yaesu FT-840
When new = $500
circa 1985

AF7J

Tom Harrington

K7NJY

John Merrill - sk

More HF Transceivers

Yaesu FT-857
$825

Yaesu FT-897
$999

HF Transceivers **

w/ General coverage receivers

Kenwood TS-570
When new = $1000
circa 2000

KE7ROQ
Justin Doxford

HF Transceivers *

w/ General coverage receivers

Kenwood TS-570
When new = $1000
circa 2000

KE7ROQ
Justin Doxford

KO7U
Kim Owen

HF Transceivers

w/ General coverage receivers

Kenwood TS-570
When new = $1000
circa 2000

KE7ROQ
Justin Doxford

KO7U
Kim Owen

My Favorite Radio - ever

K7HCP
Val Campbell

My old radio

HF Transceivers *

w/ General coverage receivers

Kenwood TS-590

Replaced the TS-570

New = $1600

circa 2015

HF Transceivers

w/ General coverage receivers

KO7U
Kim Owen

My
new radio

K7HCP
Val Campbell

Icom IC-756-Pro II or III (100 watt)

w/ everything $2700

HF Transceivers *

w/ General coverage receivers

Mike's old radio

KZ7O
Mike Fullmer

HF / VHF / UHF / Satellite

Kenwood TS-2000 $1500

HF Transceivers

w/ General coverage receivers

Mike's old radio

KZ7O
Mike Fullmer

HF / VHF / UHF / Satellite

Kenwood TS-2000 $1500

HF / 6M 100 Watt

Yaesu FT-3000 $2300

Mike's new radio

Power Supplies

Power Supply *

Jell Cell battery

for QRP use

12 Volt

Power Supply

Jell Cell battery

for QRP use

12 Volt

Switching power supply

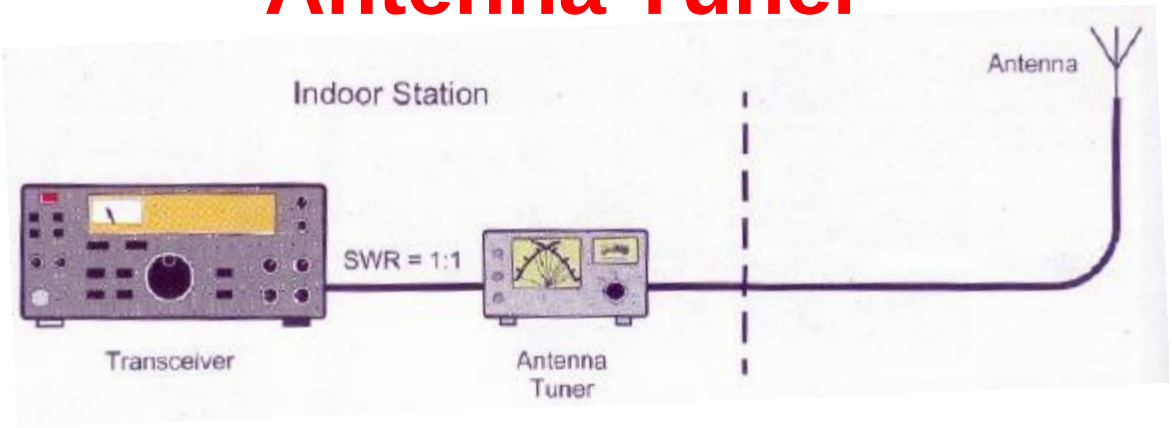
12 Volt 20+ Amp

(for 100 watt transceiver)

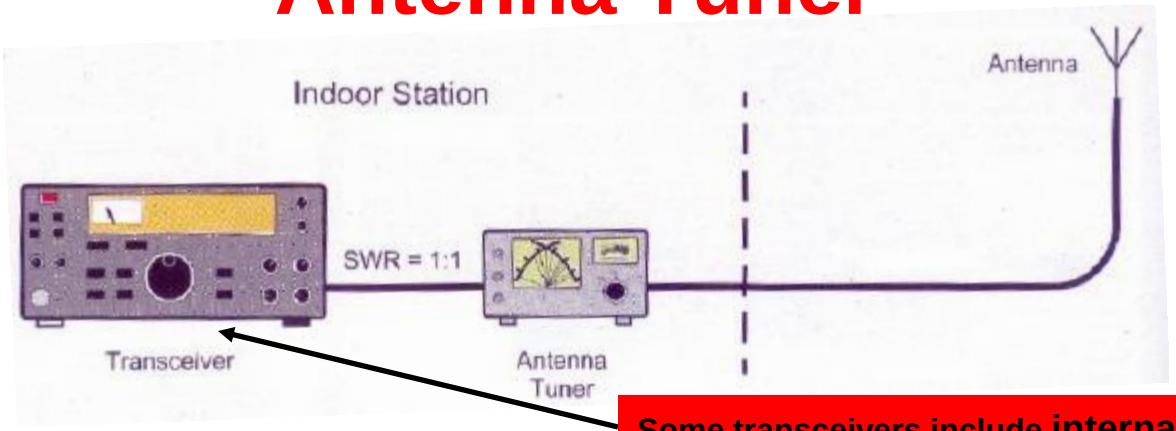
$120

Antenna Tunners

Antenna Tuner ****

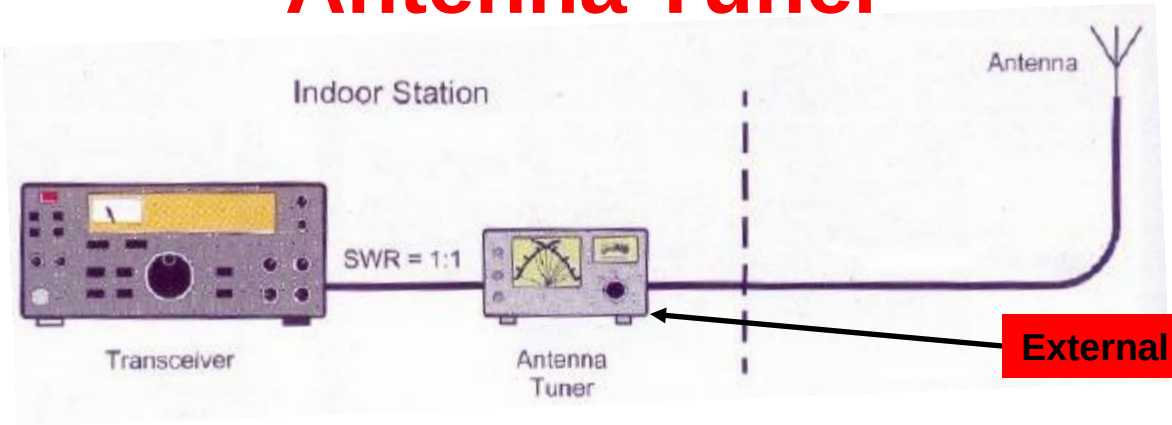


Antenna Tuner ***

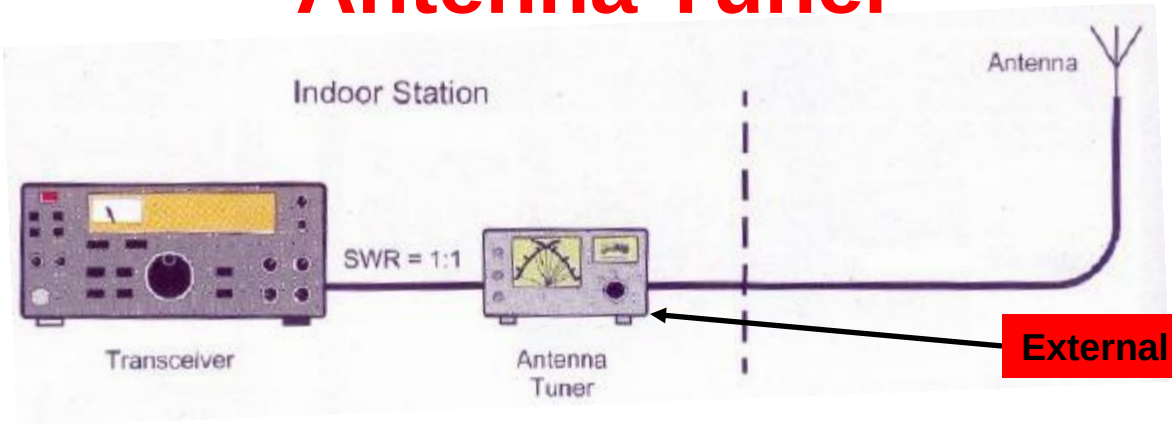


Some transceivers include <u>internal</u> antenna tuners

Antenna Tuner **



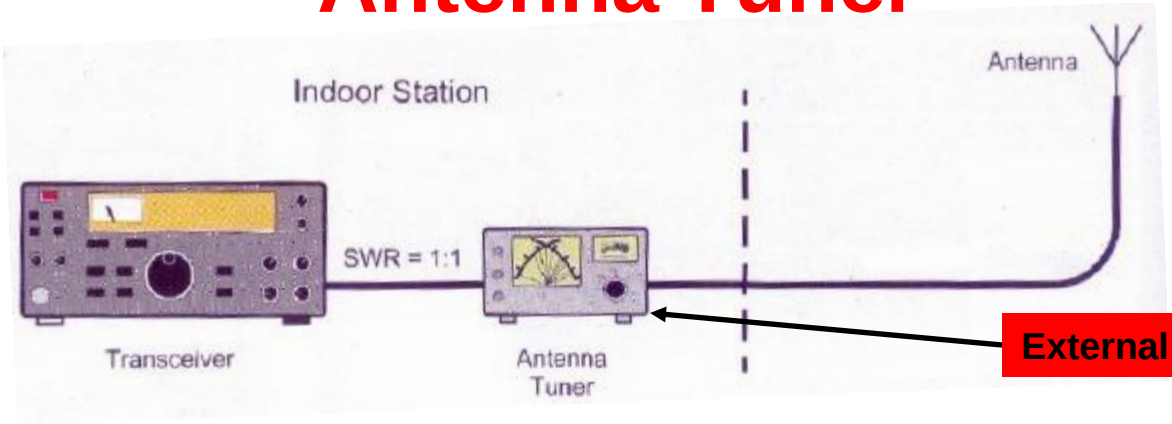
Antenna Tuner *



Manual external antenna tuner

$150

Antenna Tuner



Manual external antenna tuner

$150

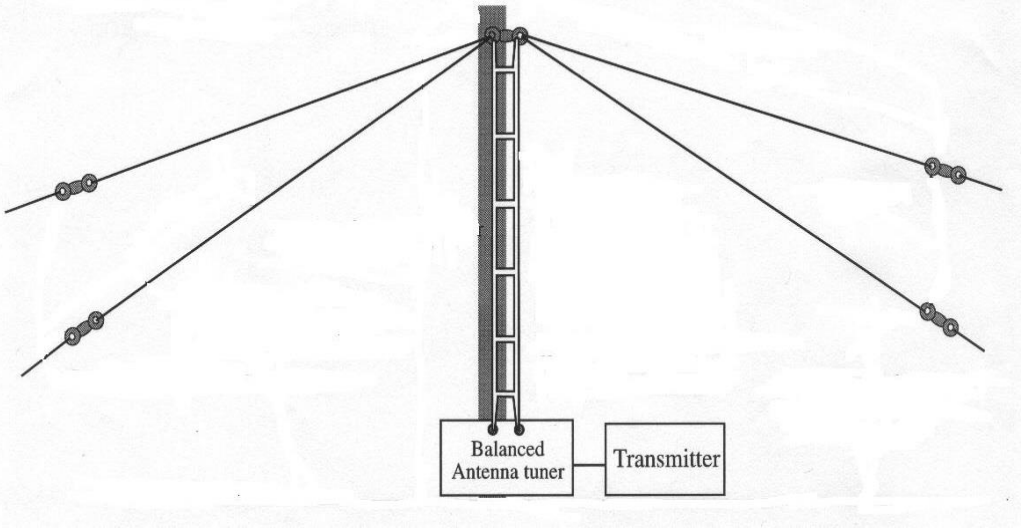
Automatic external antenna tuner

$179

Antennas

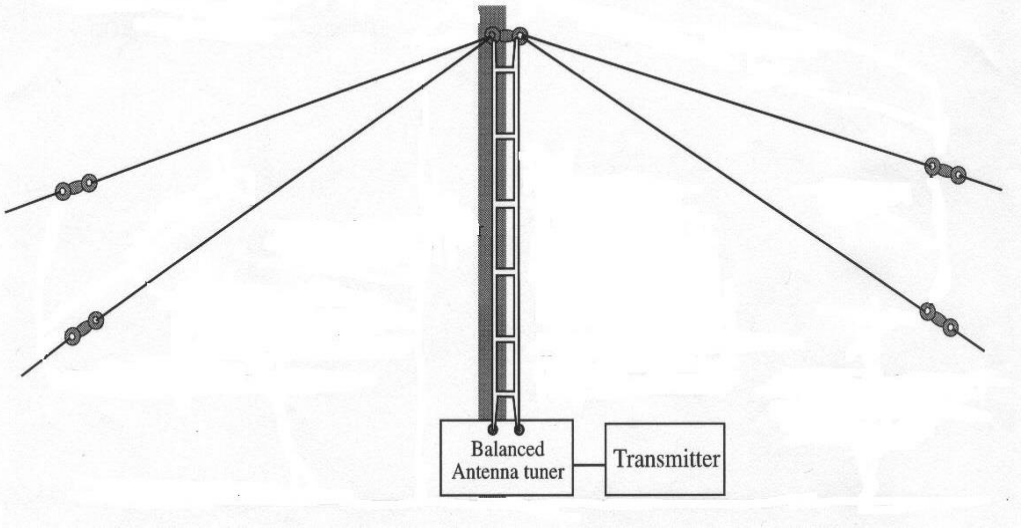
Antennas ***

Multi-band antenna



Antennas **

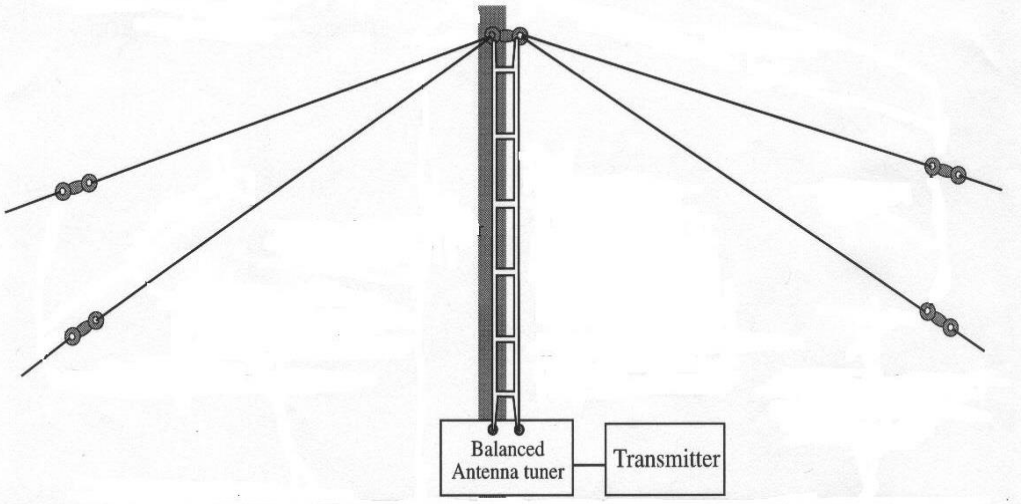
Multi-band antenna



G5RV (requires antenna tuner)

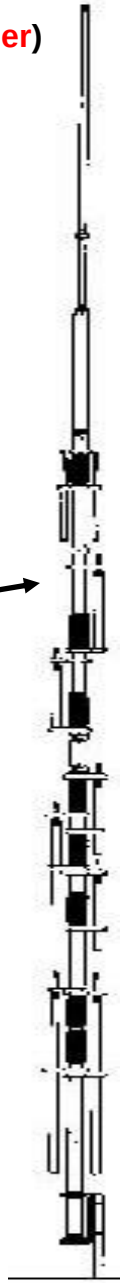
Antennas *

Multi-band antenna



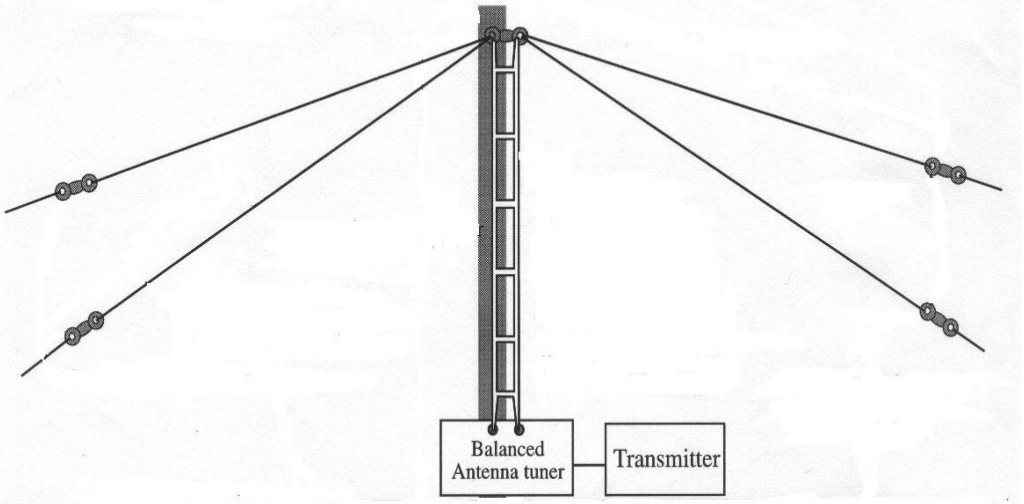
G5RV (requires antenna tuner)

Multi-band vertical



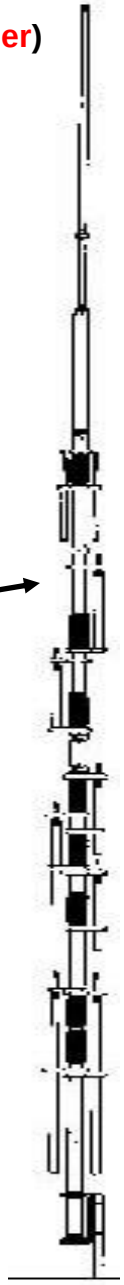
Antennas

Multi-band antenna

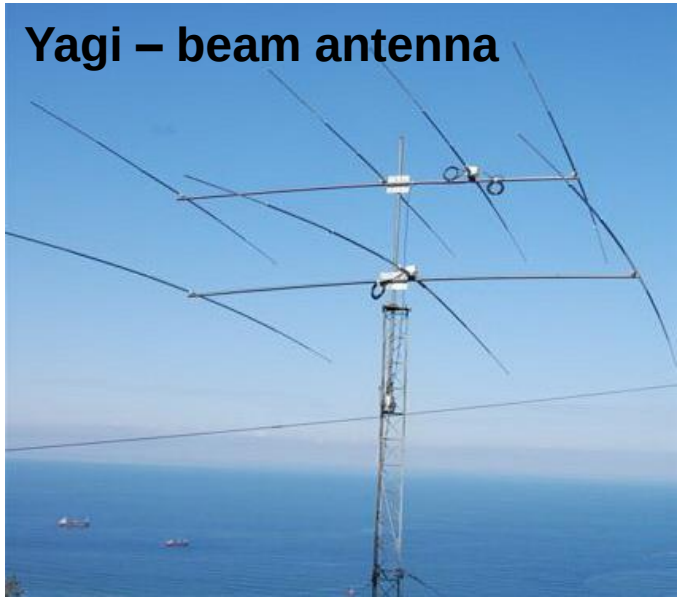


G5RV (requires antenna tuner)

Multi-band vertical



Yagi – beam antenna



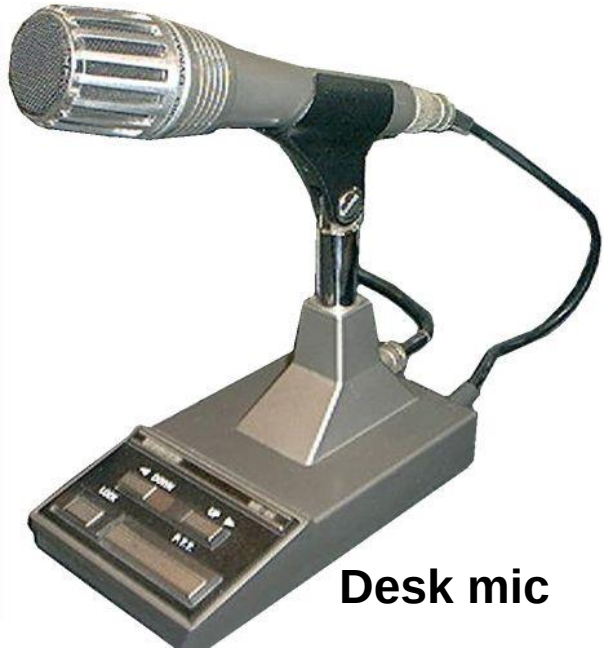
Microphones

Microphones ***

Hand mic

Microphones **

Hand mic

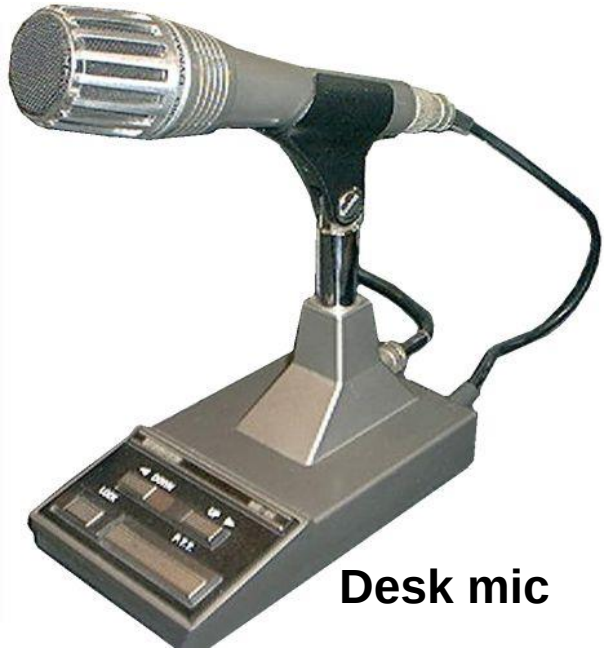


Desk mic

Microphones *

Hand mic

Classic mic



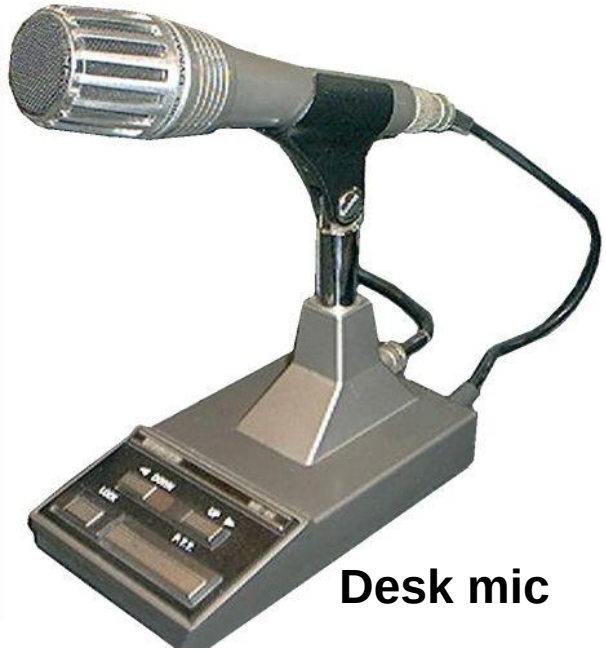
Desk mic

Microphones

Hand mic

Classic mic

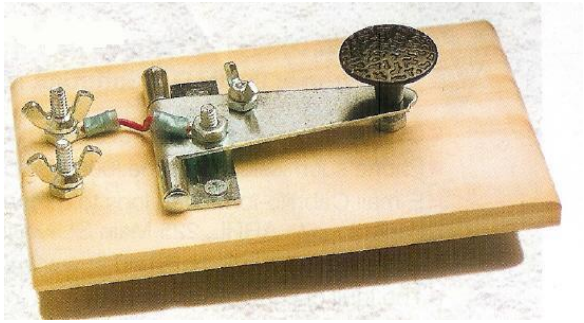
Quality mic



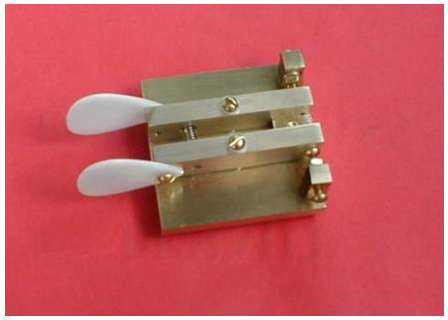
Desk mic

Keys and Keyers

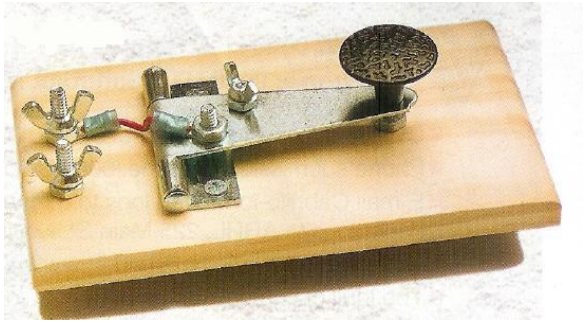
CW Keys & Keyers ******



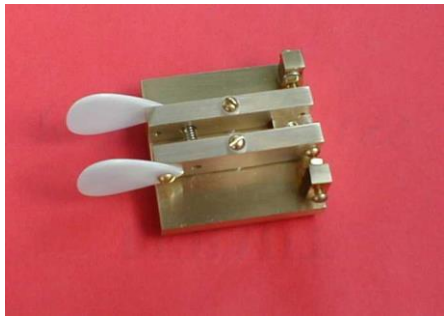
Key (home made)

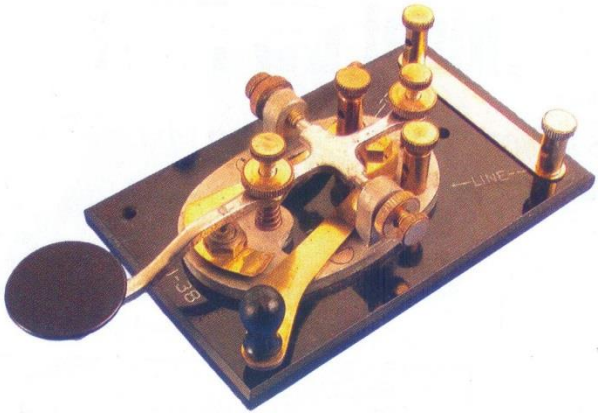


CW Keys & Keyers *****



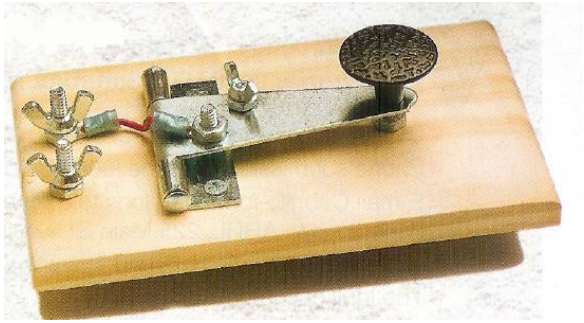
Key (home made)



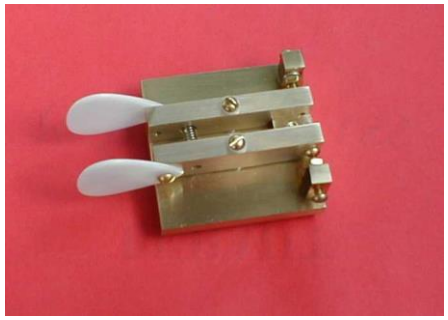


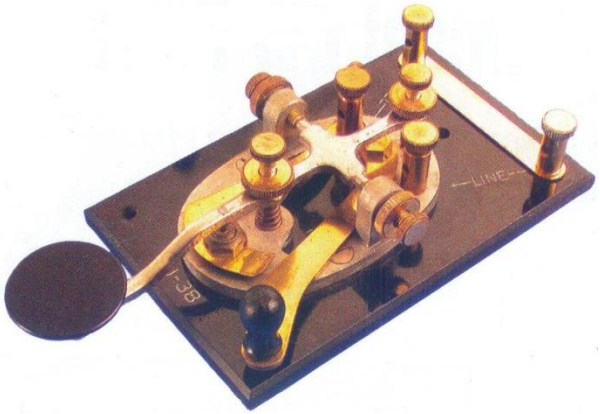
Straight key (J-38 series)

CW Keys & Keyers ****



Key (home made)



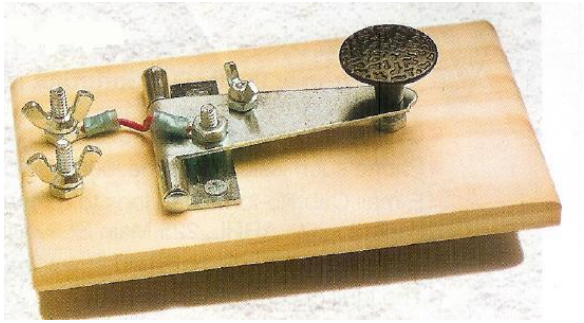


Straight key (J-38 series)

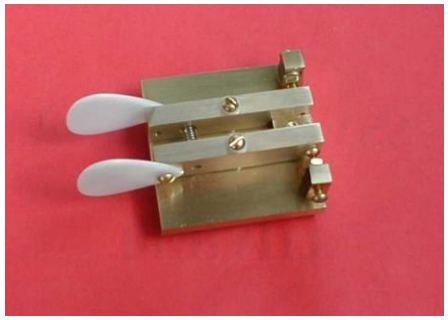
cq cq cq

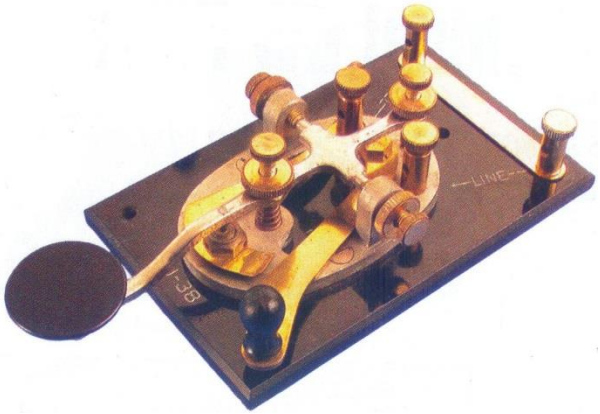
de k7hcp k

CW Keys & Keyers ***



Key (home made)

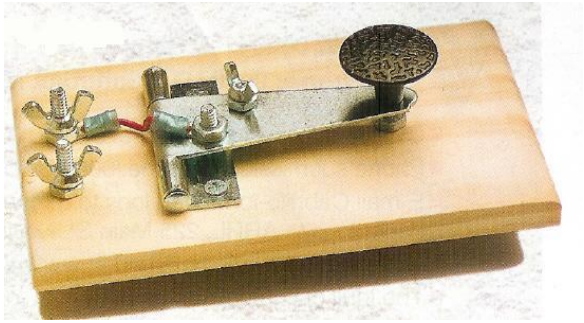




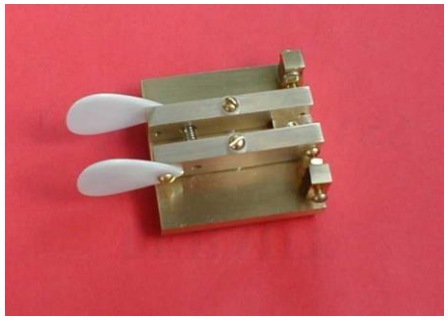
Straight key (J-38 series)

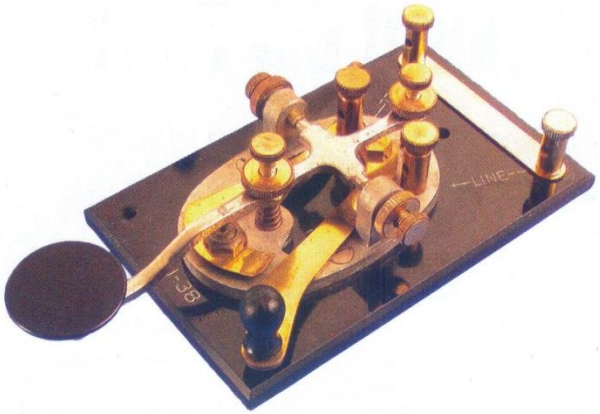
Navy flame proof key

CW Keys & Keyers **



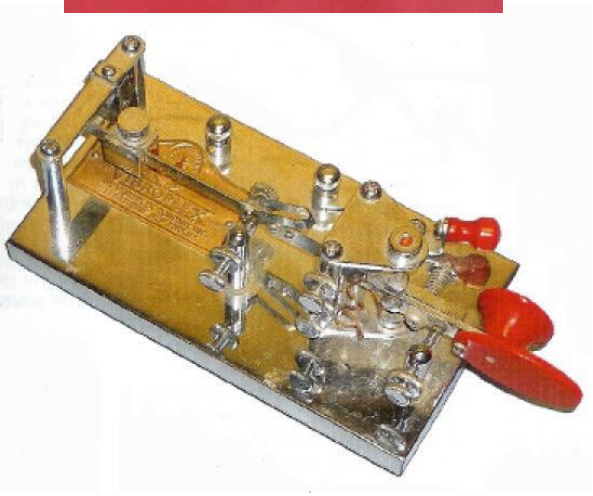
Key (home made)





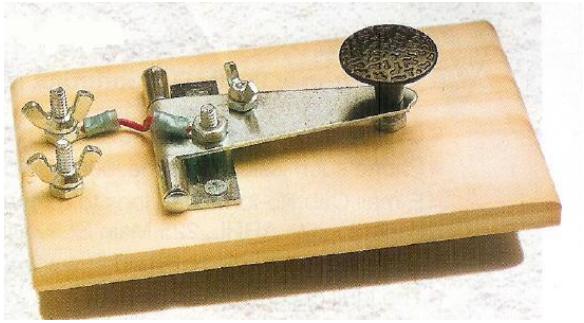
Straight key (J-38 series)

Navy flame proof key

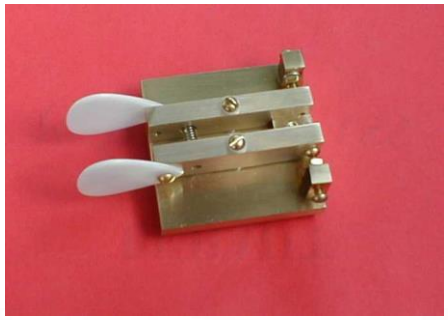


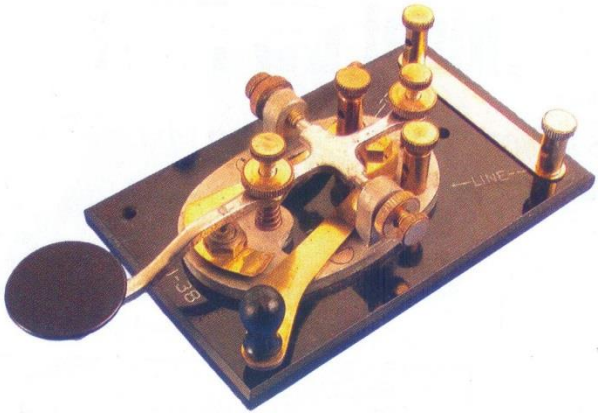
Semi-automatic bug

CW Keys & Keyers *



Key (home made)





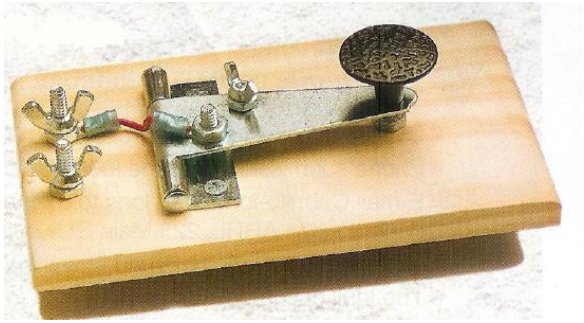
Straight key (J-38 series)

Navy flame proof key

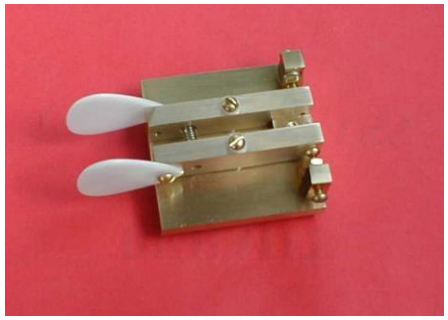
Semi-automatic bug

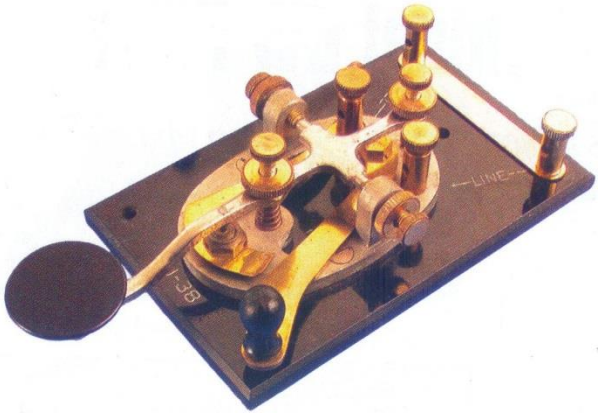
Paddle by Bencher

CW Keys & Keyers



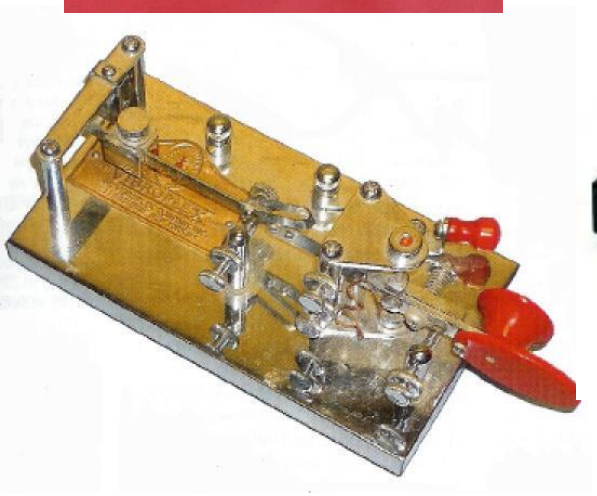
Key (home made)





Straight key (J-38 series)

Navy flame proof key



Semi-automatic bug

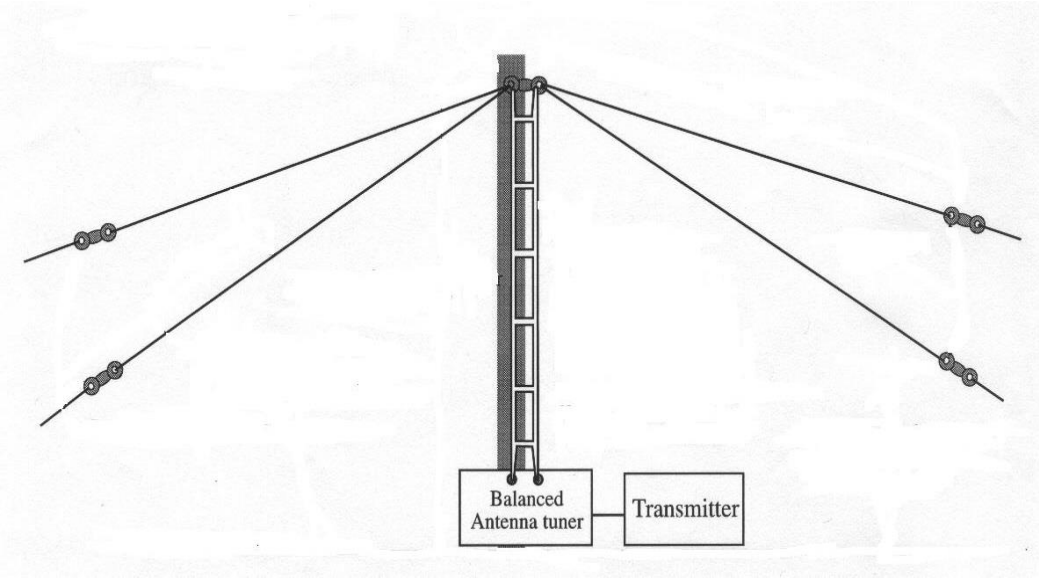
Paddle by Bencher

Paddle w/ external electronic keyer(*)

(*) Required for paddle if not built into transceiver

Get Started

Starter HF Station



Dipole Wire Antenna $25

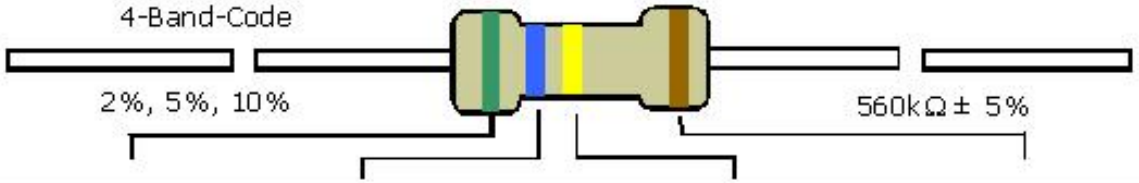
Icom IC-703 HF QRP (10 watt)
multi-mode, w/ tuner, w/ keyer
New $499

Val Campbell K7HCP station

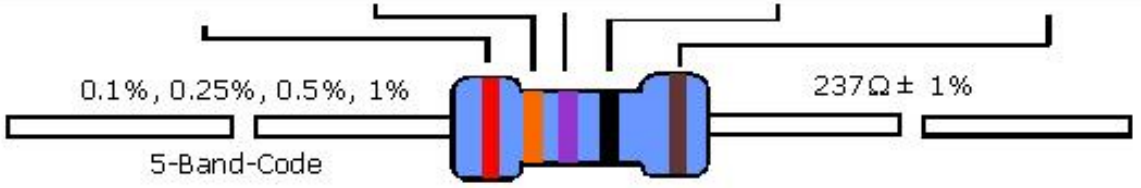
Jim Southwick N7JS station

Build a Kit

Resistor Color Code



COLOR	1st BAND	2nd BAND	3rd BAND	MULTIPLIER	TOLERANCE
Black	0	0	0	1Ω	
Brown	1	1	1	10Ω	± 1% (F)
Red	2	2	2	100Ω	± 2% (G)
Orange	3	3	3	1KΩ	
Yellow	4	4	4	10KΩ	
Green	5	5	5	100KΩ	±0.5% (D)
Blue	6	6	6	1MΩ	±0.25% (C)
Violet	7	7	7	10MΩ	±0.10% (B)
Grey	8	8	8		±0.05%
White	9	9	9		
Gold				0.1	± 5% (J)
Silver				0.01	± 10% (K)



Soldering Iron or Gun ***

Soldering Iron or Gun **

Soldering Iron or Gun *

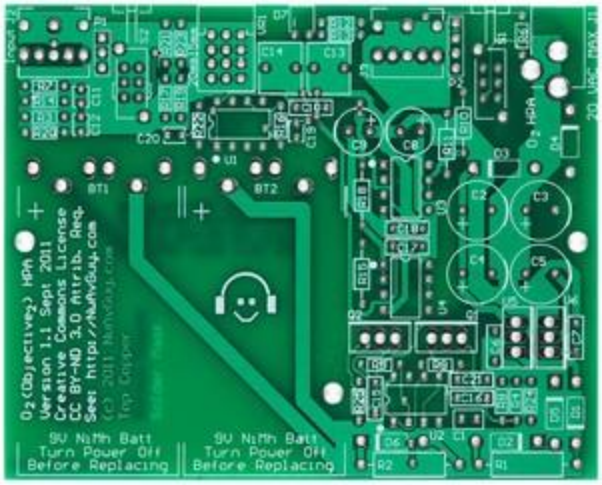
Soldering Iron or Gun

Crystal Radio Kit

Crystal Radio Kit

Build the Crystal Radio You Made as a Kid with a Youngster Today—Kit Has Everything You Need

Printed Circuit Board



Radio Shack

FM Radio Kit

JameCo Electronics Kits

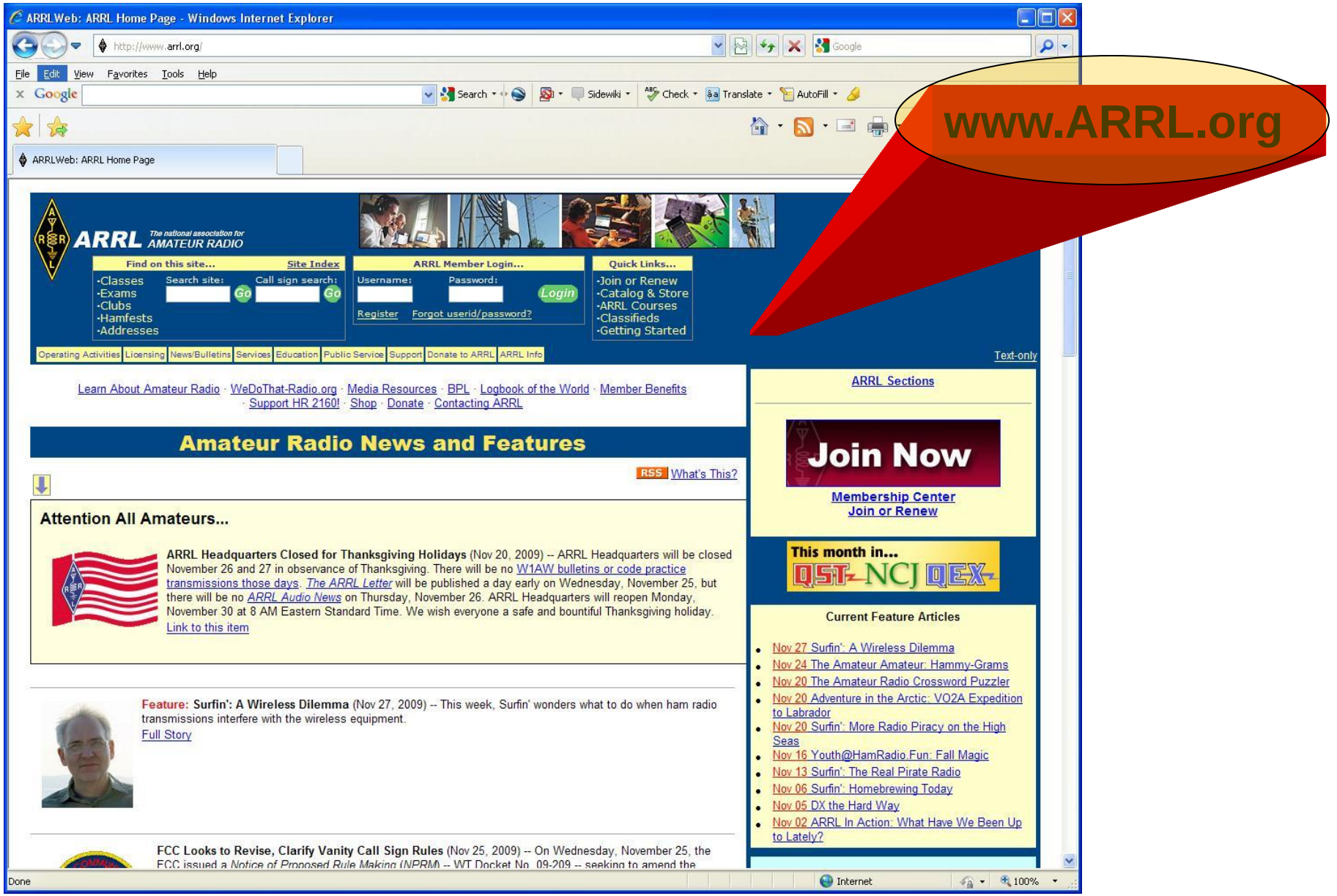
QRP Radio Kit

Ramsey Electronic Kits

(6) Ham Radio Tools & Aids

Organizations

Organizations ***



Organizations **

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Organizations *

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QST Magazine included in membership

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Organizations

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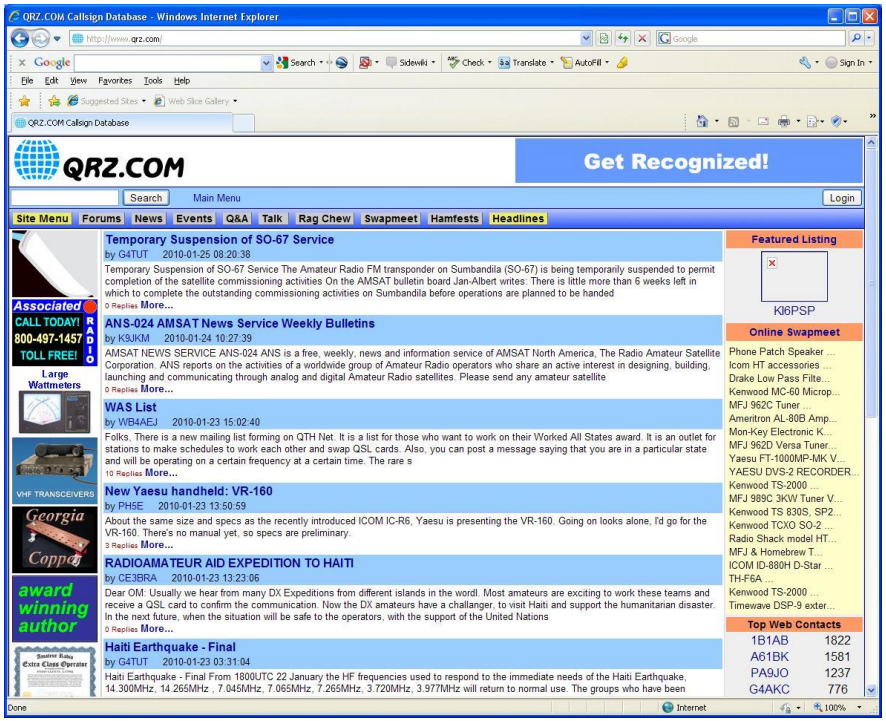
Logbook of the World

Web Sites

Web Sites **

www.QRZ.com



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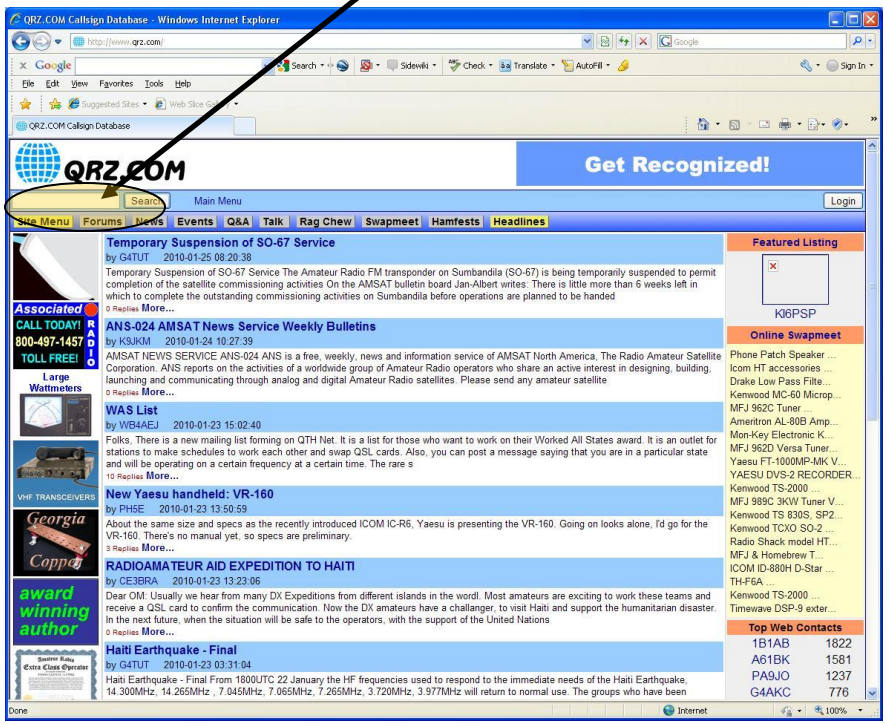

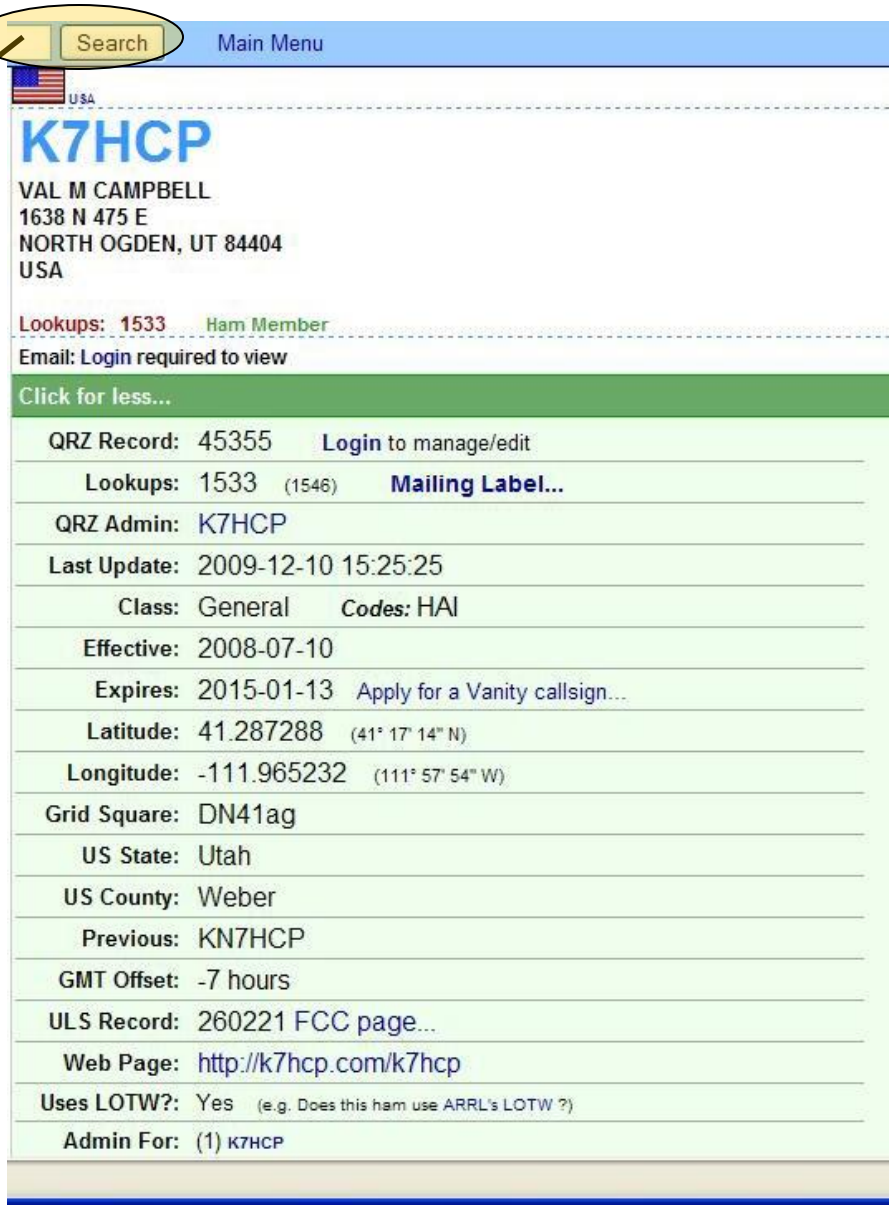

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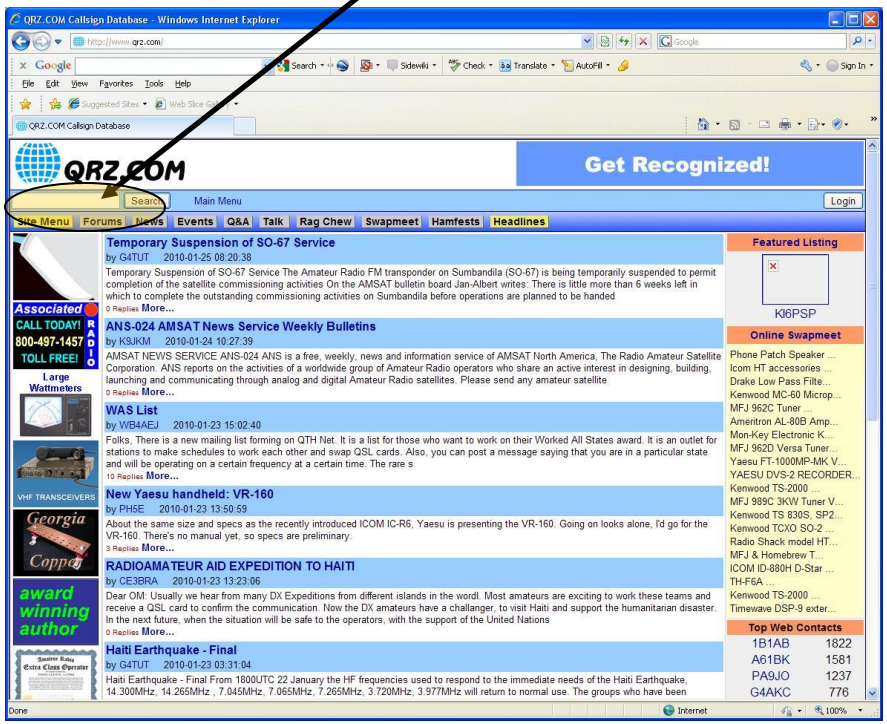

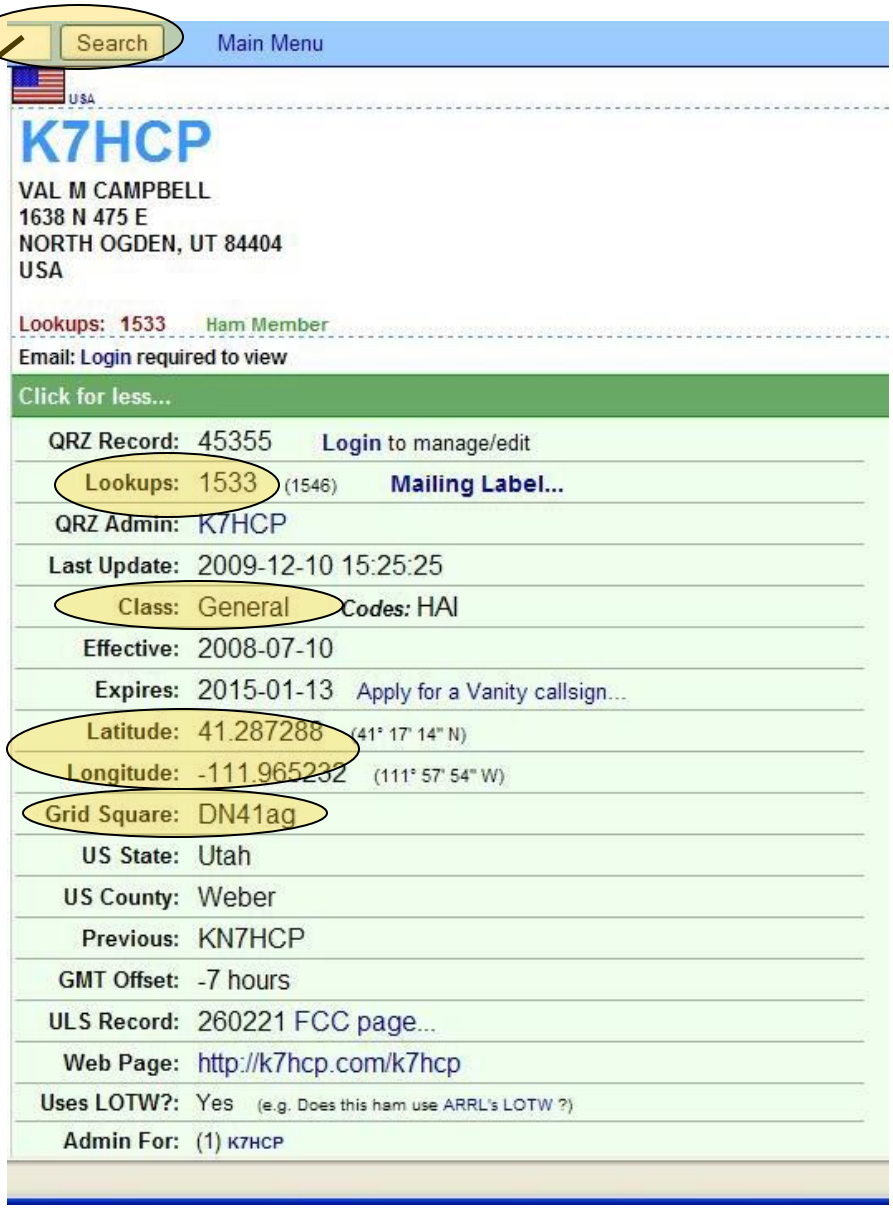

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Magazines *

Free with ARRL Membership

Magazines

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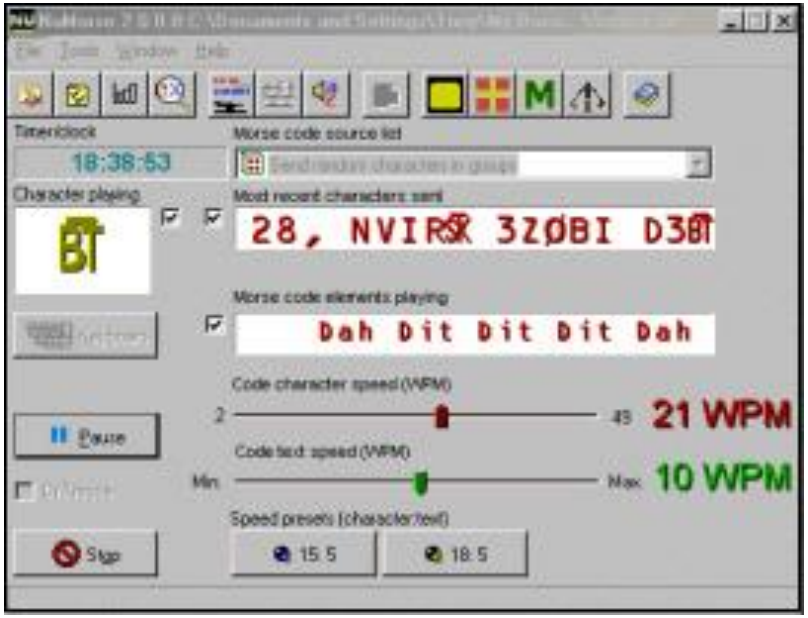
Ham Aids

Morse Code Aids *

www.numorse.com

Nu Morse



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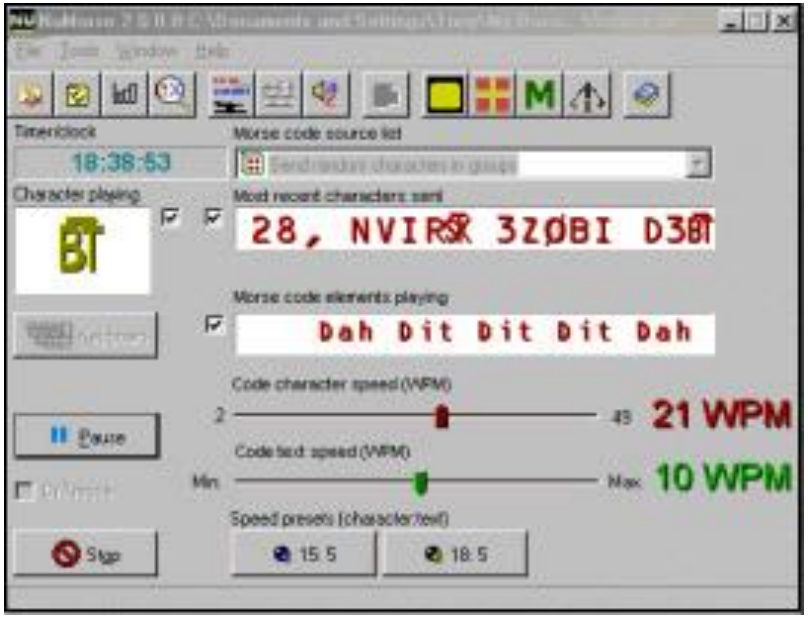
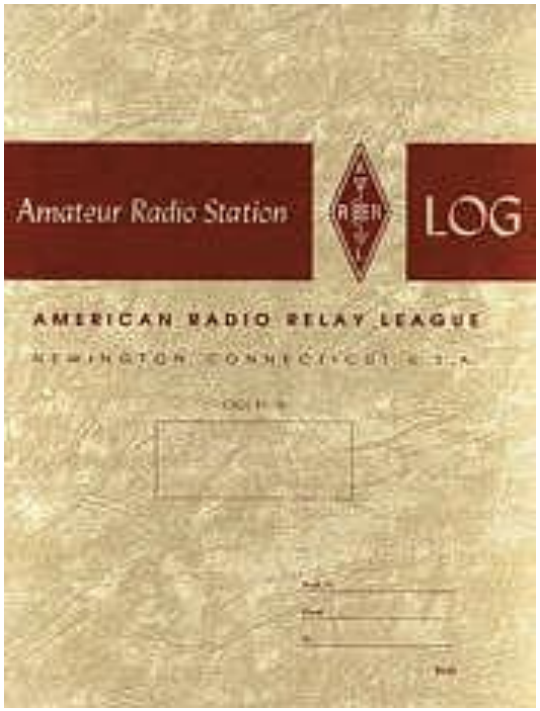


Nu Morse Pro

QSO LOGS (computer based)



Log HF QSO's

+

Manage HF QSL cards

Computer Contact Logs *

N3FJP's Amateur Radio Software

www.N3FJP.com

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10 Meter Log

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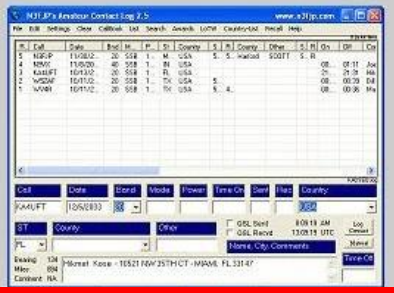

Amateur contact log

Field Day contact log

Thanks for visiting our amateur radio software website! I became an amateur radio operator in 1976, at the age of 14 and have been enjoying many facets of amateur radio ever since. I enjoy working contests, making contacts via CW and phone, experimenting with antennas and general tuning around the bands. My lovely XYL, Kimberly, KA3SEQ, is my partner in all the contesting and software endeavors. We also share the hobby of amateur radio with our two sons, Christopher, KB3KCN, and Bradley, KB3MNE.

As an extension of my Amateur Radio hobby, I became interested in computer programming. I wanted to create easy to use software for my station that performed a variety of functions for contesting and general logging. I began with a program to log contacts during November Sweepstakes and shared it with local hams. The program was so well liked, that I started to receive requests for additional software.

From that first program our software library has grown to the list you see at your left. Amateur Contact Log is an easy to use general logging program that has many great features including tracking of worked all states, counties and countries. The rest of our programs are easy to use "contest specific" applications. We are thrilled with the positive response we have received concerning our software, and we can't thank you all enough for your ideas, kind words and encouragement.

Please click the links on the left to browse through our software library, try our programs, put them through their paces and see what you think. We hope that you enjoy these programs, and if you find them useful, please tell a friend!

[redacted]

Done

Internet

100%

Computer Contact Logs

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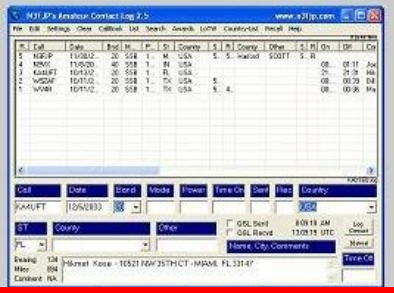

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Download Call Sign Data Base

[redacted]

Done

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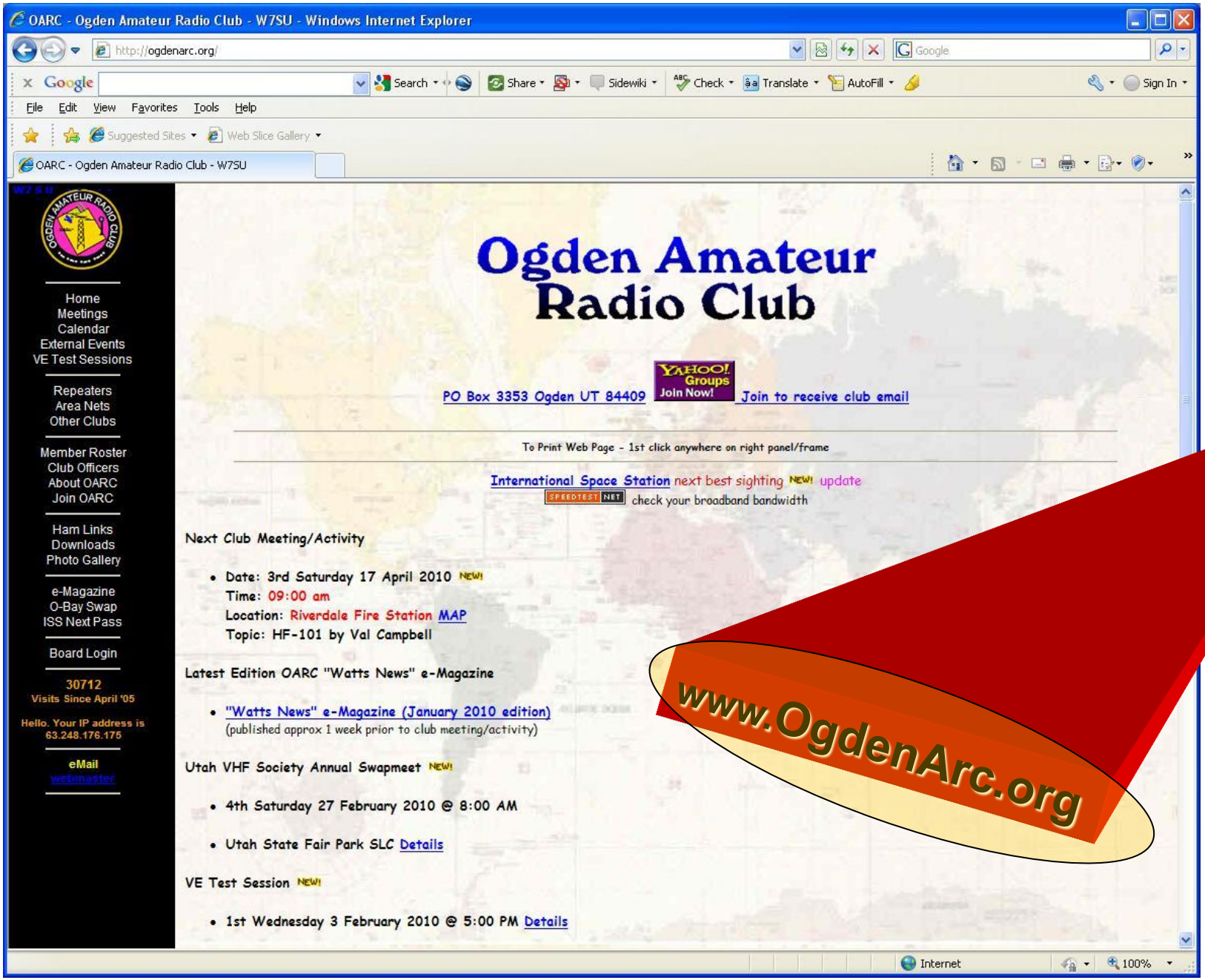
100%

Clubs

Clubs ****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http://ogdenarc.org/
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Date: 3rd Saturday 17 April 2010 NEW!
Time: 09:00 am
Location: Riverdale Fire Station MAP
Topic: HF-101 by Val Campbell
Latest Edition OARC "Watts News" e-Magazine
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Utah VHF Society Annual Swapmeet NEW!
4th Saturday 27 February 2010 @ 8:00 AM
Utah State Fair Park SLC Details
VE Test Session NEW!
1st Wednesday 3 February 2010 @ 5:00 PM Details
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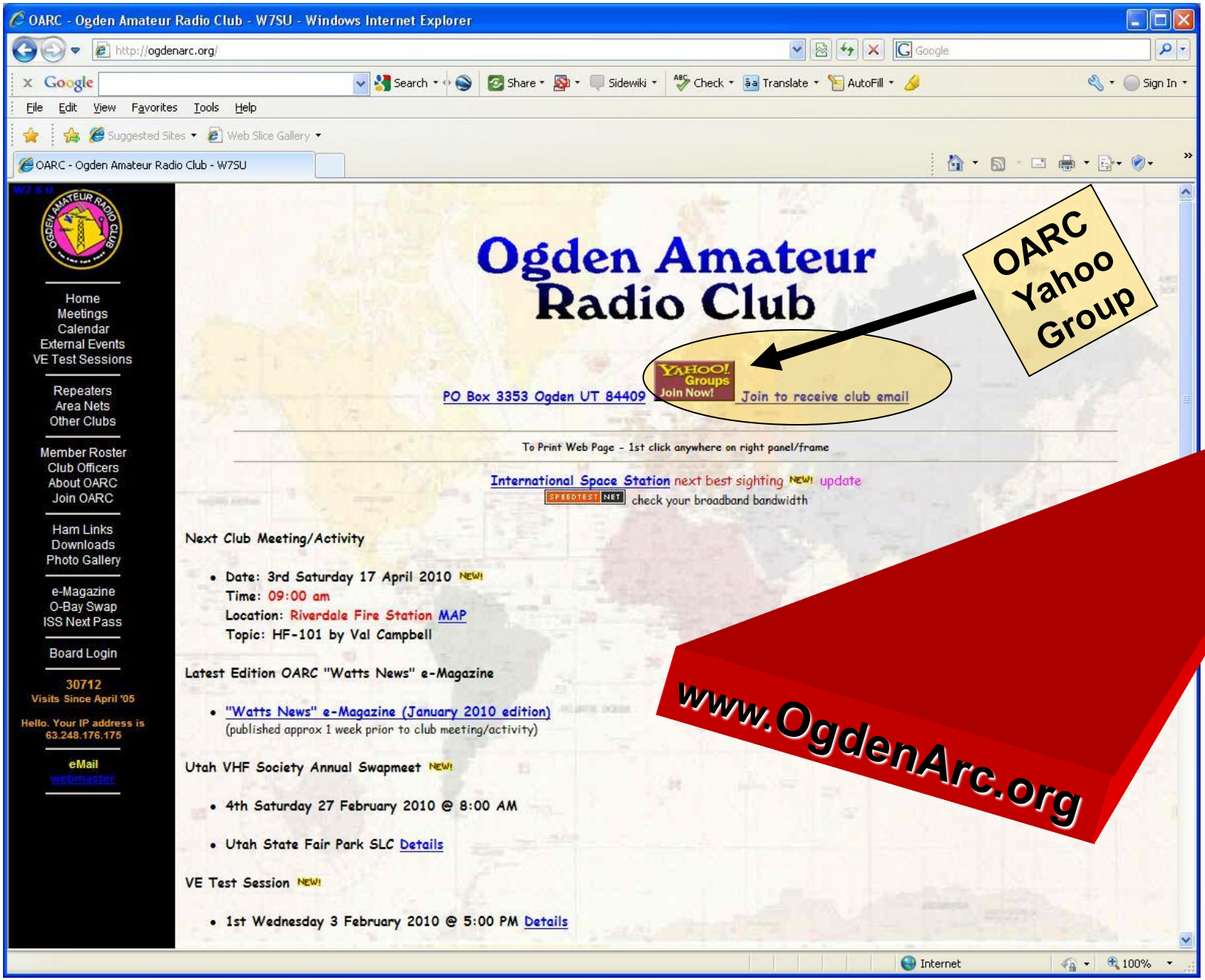
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Join our Club

Club Membership

Get Connected

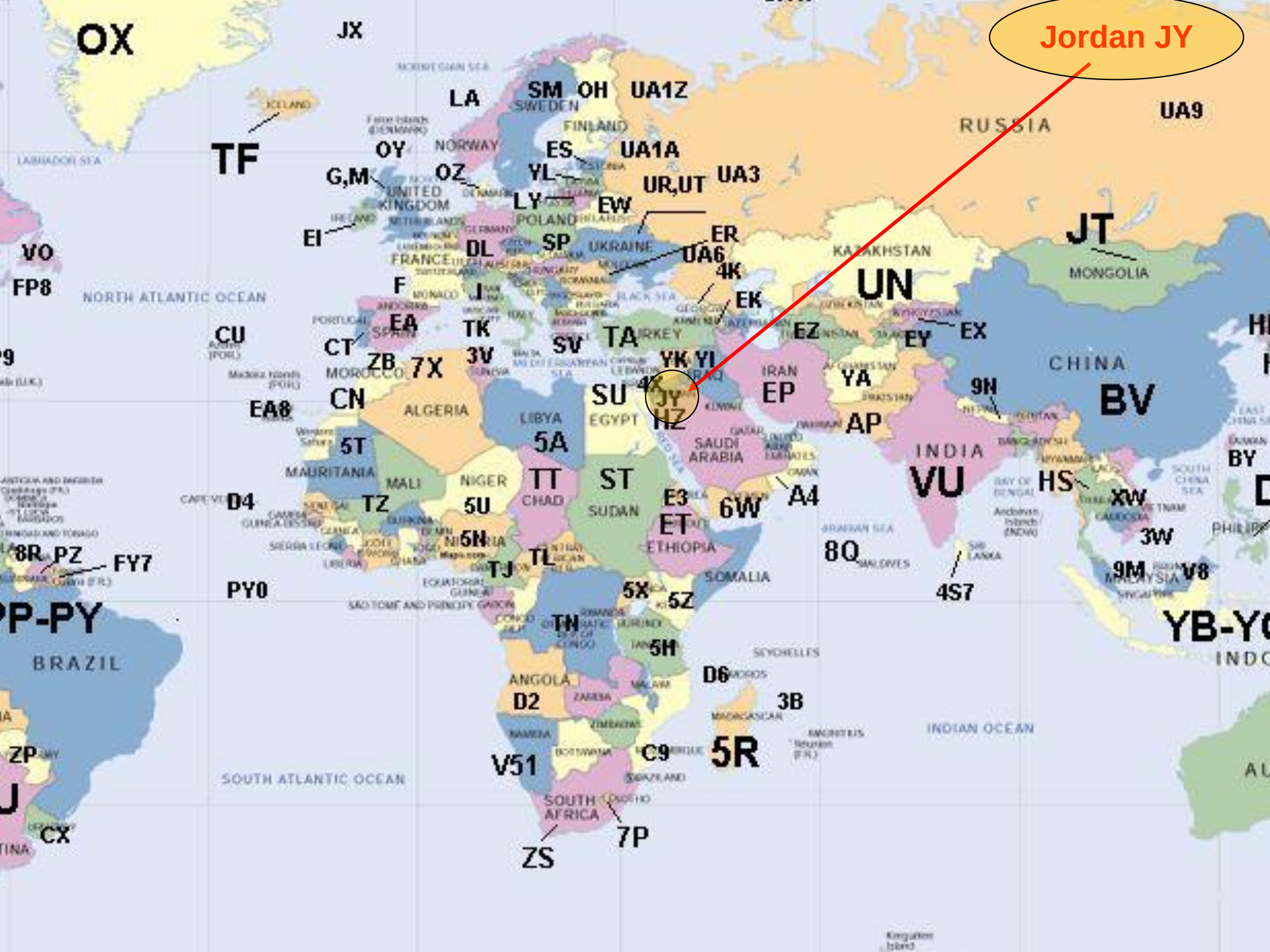
Call sign Hat

Call sign Shirt

Call sign Badge

Call sign Tags

Hams of this World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7P
CX
ZS

World Leaders

- **Former King Hussein of Jordan – JY1**
  - He was well-known to ham radio operators throughout the world as the friendly voice of "JY1".
  - His daughter was a licensed ham also

US Leaders

Walter Cronkite - KB2GSD

CBS News

US Leaders

Barry Goldwater – K7UGA

Senator (AZ)

US Celebrates

Art Bell – W6OBB

American broadcaster and host of the radio program

Coast to Coast AM

US Celebrates

Tim Allen – “Last Man Standing”

Pseudo call sign = KA0XTT

Now = KK6OTD

Became licensed last September 2014 for real

2 dozen TV crew members became licensed also

Hams out of this World

All US International Space Station (ISS) astronauts are licensed (Technician Class) Amateur Radio Operators

So that's what you might be missing in Ham Radio

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NOTE

OARC will be conducting a General Class Licensing Class during the month of January 2016 followed by a VE Test Session.

So what are you waiting for?

Upgrade Now!!!

REMEMBER

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