General License Course
Chapter 2

HF Operating Techniques
Procedures and Practices

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Good Practices

The FCC regulations help stations using compatible modes stay together by dividing the amateur frequency bands.

Additional divisions of the band have been created by radio amateurs and are used on a strictly voluntary basis. These are called "*Band Plans.*"

When choosing a frequency for SSTV, RTTY, FT4/8, or PSK31 operation, check the band plan for recommended frequencies

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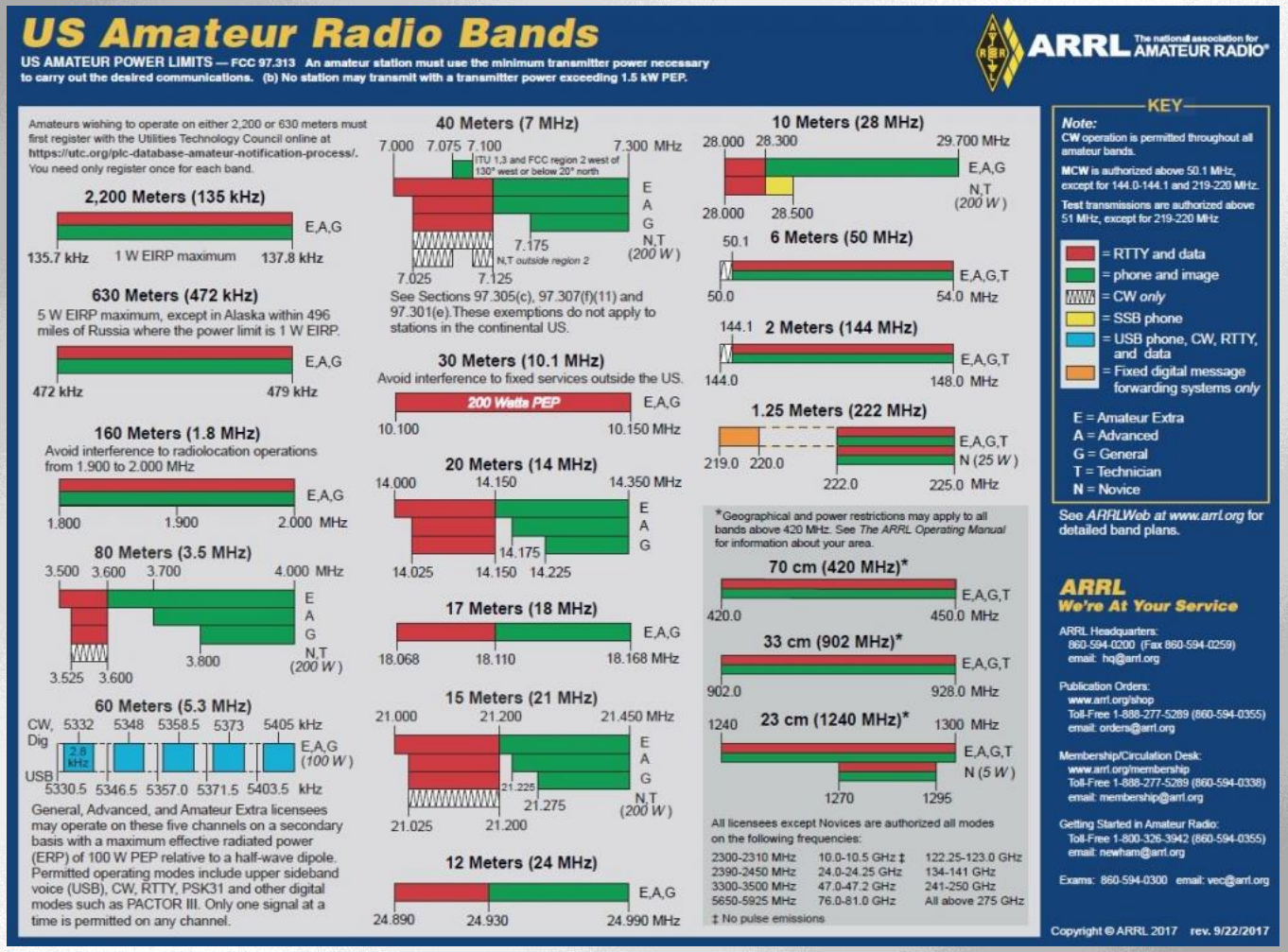
Meters vs. Frequency: 300 ÷ Freq (MHz) = Wavelength (Meters)

300 ÷ 14.2 MHz ≈ 20 Meters



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Frequencies	*Modes/Activities*
1.800-2.000	CW
1.800-1.810	Digital Modes
1.810	QRP CW calling frequency
1.843-2.000	SSB, SSTV and other wideband modes
1.910	SSB QRP calling frequency
1.995-2.000	Experimental
1.999-2.000	Beacons
3.500-3.510	CW DX window
3.560	QRP CW calling frequency
3.570-3.600	RTTY/Data
3.585-3.600	Automatically controlled data stations
3.590	RTTY/Data DX
3.790-3.800	DX window
3.845	SSTV
3.885	AM calling frequency
3.985	QRP SSB calling frequency
7.030	QRP CW calling frequency
7.040	RTTY/Data DX
7.070-7.125	RTTY/Data
7.100-7.105	Automatically controlled data stations
7.171	SSTV
7.173	D-SSTV
7.285	QRP SSB calling frequency
7.290	AM calling frequency
10.130-10.140	RTTY/Data
10.140-10.150	Automatically controlled data stations
14.060	QRP CW calling frequency
14.070-14.095	RTTY/Data
14.095-14.0995	Automatically controlled data stations
14.100	IBP/NCDXF beacons
14.1005-14.112	Automatically controlled data stations
14.230	SSTV
14.233	D-SSTV

Frequencies	*Modes/Activities*
14.236	Digital Voice
14.285	QRP SSB calling frequency
14.286	AM calling frequency
18.100-18.105	RTTY/Data
18.105-18.110	Automatically controlled data stations
18.110	IBP/NCDXF beacons
18.162.5	Digital Voice
21.060	QRP CW calling frequency
21.070-21.110	RTTY/Data
21.090-21.100	Automatically controlled data stations
21.150	IBP/NCDXF beacons
21.340	SSTV
21.385	QRP SSB calling frequency
24.920-24.925	RTTY/Data
24.925-24.930	Automatically controlled data stations
24.930	IBP/NCDXF beacons
28.060	QRP CW calling frequency
28.070-28.120	RTTY/Data
28.120-28.189	Automatically controlled data stations
28.190-28.225	Beacons
28.200	IBP/NCDXF beacons
28.385	QRP SSB calling frequency
28.680	SSTV
29.000-29.200	AM
29.300-29.510	Satellite downlinks
29.520-29.580	Repeater inputs
29.600	FM simplex
29.620-29.680	Repeater outputs

ARRL band plans for frequencies above 28.300 MHz are shown in *The ARRL Repeater Directory* and on **arrl.org.**

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Good Practices

Choosing a frequency is critical - generally high bands during the day, low bands at night (AND day for local)
On HF, perfectly clear channels are rare

Be sure the chosen frequency (and mode) is *within your license privileges* and *agrees with the accepted voluntary band plan*, then *listen, listen, listen to be sure the frequency is open*

Ask if the frequency is in use ("*Is the frequency in use? This is AI2N*") twice. If using CW or digital modes, send: "***QRL**? DE AI2N*"

Tune around, listen to others operating, emulate them

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Nets and Schedules

Many on-the-air activities are scheduled in advance

Courtesy and flexibility are required by everyone – have a backup plan

If you're in a QSO and another station requests the use of the frequency for a regularly-scheduled activity or net, try to accommodate the request

If you're the net control and the net's chosen frequency is busy, find a clear frequency

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Good Practices

Except during FCC-declared emergencies no one “owns” a frequency – have a “Plan B”, practice common courtesy

If propagation changes during your contact and you notice increasing interference from other activity on the same frequency, attempt to resolve the problem to everyone’s satisfaction.

Operation with *some* QRM present IS a valuable skill to acquire.

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Standardized phonetics are important on HF!

NATO Phonetic Alphabet

A	Alpha	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	Juliett	W	Whiskey
K	Kilo	X	X-ray
L	Lima	Y	Yankee
M	Mike	Z	Zulu

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Transceiver Operation

- Operating a transceiver in "split" mode means that the transceiver is set to different transmit and receive frequencies.
- A common use for the dual VFO feature on a transceiver is to permit ease of monitoring of two different receive frequencies simultaneously.
- Only one frequency will be selected for transmit. Both receivers will be off during transmit.

Transceiver Split Operation

5J0X (San Andres Island) calling CQ on 28007 KHz – listening UP

Several stations calling -
GA3YOR responding on 28008.31 Khz
(it took a while for me to find him; the DX station also had trouble with QRM)

C:\Users\ai2n\Videos\General Course - Videos\Split_Mode_Demo.wmv

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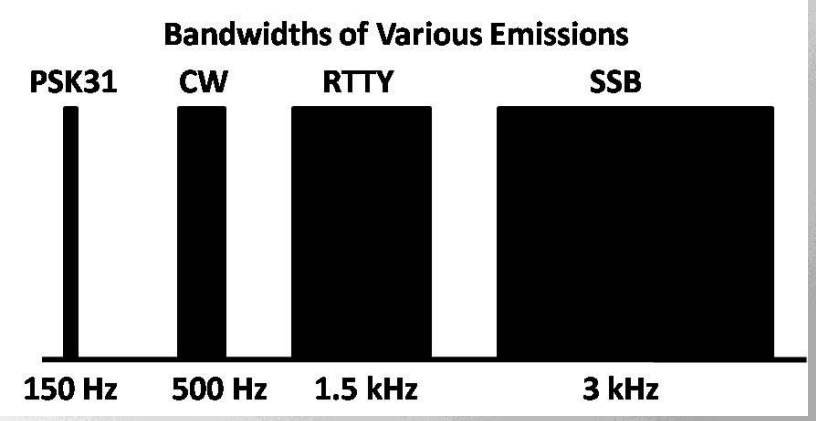
Good Practices

Try to put enough separation between your signal and adjacent signals to minimize interference.

On CW – 150 to 500 Hz

On SSB – 2 to 3 kHz



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Take Quiz 1

G2B01 - Which of the following is true concerning access to frequencies?

A. Nets have priority

B. QSOs in progress have priority

C. Except during emergencies, no amateur station has priority access to any frequency

D. Contest operations should yield to non-contest use of frequencies

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G2B03 - What is good amateur practice if propagation changes during a contact creating interference from other stations using the frequency?

A. Advise the interfering stations that you are on the frequency and that you have priority

B. Decrease power and continue to transmit

C. Attempt to resolve the interference problem with the other stations in a mutually acceptable manner

D. Switch to the opposite sideband

G2B03 - What is good amateur practice if propagation changes during a contact creating interference from other stations using the frequency?

A. Advise the interfering stations that you are on the frequency and that you have priority

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G2B04 - When selecting a CW transmitting frequency, what minimum separation from other stations should be used to minimize interference to stations on adjacent frequencies?

A. 5 Hz to 50 Hz

B. 150 Hz to 500 Hz

C. 1 kHz to 3 kHz

D. 3 kHz to 6 kHz

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G2B05 - When selecting an SSB transmitting frequency, what minimum separation should be used to minimize interference to stations on adjacent frequencies?

A. 5 Hz to 50 Hz

B. 150 Hz to 500 Hz

C. 2 kHz to 3 kHz

D. Approximately 6 kHz

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G2B06 - How can you avoid harmful interference on an apparently clear frequency before calling CQ on CW or phone?

A. Send "QRL?" on CW, followed by your call sign; or, if using phone, ask if the frequency is in use, followed by your call sign

B. Listen for 2 minutes before calling CQ

C. Send the letter "V" in Morse code several times and listen for a response, or say "test" several times and listen for a response

D. Send "QSY" on CW or if using phone, announce "the frequency is in use," then give your call sign and listen for a response

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G2B07 - Which of the following complies with commonly accepted amateur practice when choosing a frequency on which to initiate a call?

A. Listen on the frequency for at least two minutes to be sure it is clear

B. Identify your station by transmitting your call sign at least 3 times

C. Follow the voluntary band plan

D. All these choices are correct

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In practice all these answers are -partly- correct...

G2C04 - What does the Q signal "QRL?" mean?

A. "Will you keep the frequency clear?"

B. "Are you operating full break-in?" or "Can you operate full break-in?"

C. "Are you listening only for a specific station?"

D. "Are you busy?" or "Is this frequency in use?"

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G2D07 - Which of the following are examples of the NATO Phonetic Alphabet?

A. Able, Baker, Charlie, Dog

B. Adam, Boy, Charles, David

C. America, Boston, Canada, Denmark

D. Alpha, Bravo, Charlie, Delta

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G4A12 - Which of the following is a common use of the dual-VFO feature on a transceiver?

A. To allow transmitting on two frequencies at once

B. To permit full duplex operation -- that is, transmitting and receiving at the same time

C. To transmit on one frequency and listen on another

D. To improve frequency accuracy by allowing variable frequency output (VFO) operation

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Making Contacts

Many amateurs keep a written or electronic log, even though the FCC does not require it, *to help with a reply if the FCC requests information*. It's also handy to keep track of awards or QSLs

Many types of digital logging software are available

The following information is traditionally contained in a station log:

- *Date and time of contact*
- *Band and/or frequency of the contact*
- *Call sign of station contacted and the signal report given*

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Basic Operating

Operating techniques on HF are different from VHF and UHF FM operation

Not “channelized” (usually) - you choose the frequency

Often not as clear/audible, more prone to fading/QRM

CQ – Calling any station - anyone anywhere could answer. Repeat “CQ” several times, say “this is”, says your call sign a couple times, then listen.

CQ DX means calling stations other than in one’s own country (for us, outside the lower 48 States)

To join an on-going QSO, give your call sign once during a pause in the conversation (do NOT say “Break”!)

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Basic Operating

Also:

During contests, you'll generally hear …

"CQ Contest", "CQ test", or

"CQ from special event station"

or

CQ for stations from certain areas …

"CQ North America" or "CQ California"

Band Plans

Example of the 20 meter band plan:

- 14.060 QRP CW calling frequency
- 14.070-14.095 RTTY/Data
- 14.074 – FT8
- 14.080 - FT4
- 14.095-14.0995 Automatically controlled data
- 14.100 IBP/NCDXF beacons
- 14.1005-14.112 Automatically controlled data
- 14.230 SSTV

On 6 meters, the voluntary band plan sets aside from 50.1 to 50.125 MHz as a “DX” window.
(in our case, for stations outside the lower 48 States)

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Operating Procedures

- FCC rules require records be kept of the gain of your antenna on the 60 meter band ***if*** your antenna is other than a dipole.

Dipole gain is used as baseline (reference)

- Must not exceed 100 watts **effective radiated power** output.
- Notes kept in station logbook as permanent record
- Logs are just plain handy

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Operating Procedures

- You must always identify your station per normal FCC regulations, including during participation in a contest.
- 97.119 Station identification:
- (a) Each amateur station...must transmit its assigned call sign on its transmitting channel at the end of each communication, and at least every 10 minutes during a communication...

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Managing Interference

Interference occurs for several reasons

QRM – Interference from other signals

QRN – Static (storms, motors, power lines, etc.)

Harmful interference – Seriously degrades, obstructs, or repeatedly interrupts communication

Deliberate interference – Malicious, willful

Rare – don’t engage, just avoid it

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Types of Interference

- Harmful

Defined by FCC 97.3(a)(23) as “interference which … seriously degrades, obstructs or repeatedly interrupts a radio communication service operating in accordance with the Radio Regulations”

It’s not always illegal, but needs to be resolved to keep communicating

- Malicious, deliberate or willful

Specifically forbidden by FCC 97.101(d)

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Managing Interference

Know the strengths and weaknesses of your station and how to use your filtering and noise reduction features

Keep your transmitted signal clean

Reacting to Interference: No one owns any frequency, be flexible. Change your frequency (QSY) if necessary

During scheduled contacts or nets, identify a backup frequency in case of interference or poor band conditions

Keep a cool head … don't allow *harmful* interference to turn into *deliberate* interference!

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Take Quiz 2

G1C04 - Which of the following is required by the FCC rules when operating in the 60-meter band?

A. If you are using an antenna other than a dipole, you must keep a record of the gain of your antenna

B. You must keep a record of the date, time, frequency, power level, and stations worked

C. You must keep a record of all third-party traffic

D. You must keep a record of the manufacturer of your equipment and the antenna used

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G2A08 - What is the recommended way to break into a phone contact?

A. Say "QRZ" several times, followed by your call sign

B. Say your call sign once

C. Say "Breaker Breaker"

D. Say "CQ" followed by the call sign of either station

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G2A11 - Generally, who should respond to a station in the contiguous 48 states calling "CQ DX"?

A. Any caller is welcome to respond

B. Only stations in Germany

C. Any stations outside the lower 48 states

D. Only contest stations

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A. Only contacts with stations not within the 48 contiguous states

B. Only contacts with other stations within the 48 contiguous states

C. Only digital contacts

D. Only SSTV contacts

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G2B10 - Which of the following is good amateur practice for net management?

A. Always use multiple sets of phonetics during check-in

B. Have a backup frequency in case of interference or poor conditions

C. Transmit the full net roster at the beginning of every session

D. All these choices are correct

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G2D05 - Which of the following indicates that you are looking for an HF contact with any station?

A. Sign your call sign once, followed by the words "listening for a call" -- if no answer, change frequency and repeat

B. Say "QTC" followed by "this is" and your call sign -- if no answer, change frequency and repeat

C. Repeat "CQ" a few times, followed by "this is," then your call sign a few times, then pause to listen, repeat as necessary

D. Transmit an unmodulated carried for approximately 10 seconds, followed by "this is" and your call sign, and pause to listen -- repeat as necessary

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G2D08 - Why do many amateurs keep a station log?

A. The FCC requires a log of all international contacts

B. The FCC requires a log of all international third-party traffic

C. The log provides evidence of operation needed to renew a license without retest

D. To help with a reply if the FCC requests information about your station

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G2D09 - Which of the following is required when participating in a contest on HF frequencies?

A. Submit a log to the contest sponsor

B. Send a QSL card to the stations worked, or QSL via Logbook of The World

C. Identify your station according to normal FCC regulations

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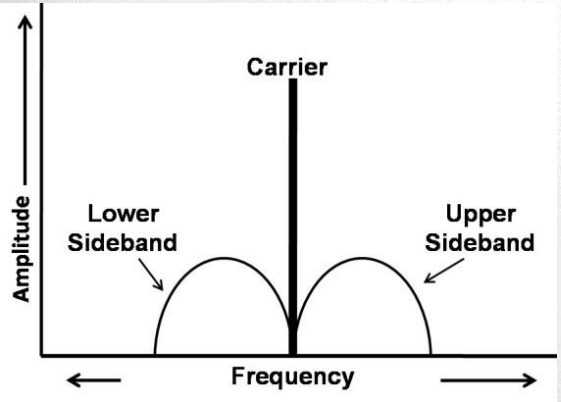
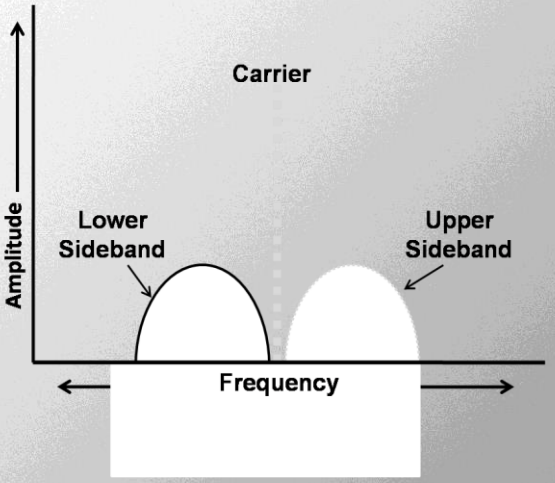
AM & SSB Modes

Amplitude Modulation (AM) and Single Sideband (SSB) Radiotelephone (voice)

On **HF**, SSB is the most common voice (phone) mode.

SSB (3 kHz) uses less bandwidth than AM (6 kHz) because only one sideband is transmitted; the carrier and the other sideband are suppressed. SSB also offers greater power efficiency.





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AM & SSB Modes

Upper sideband (USB) is used on 14 MHz and higher (20 meters – 10 meters) *and on 60 meters*

Lower sideband (LSB) is used on and below 7 MHz (160 meters, 80 meters, and 40 meters)

Upper sideband is used on VHF and UHF bands (6 meters and up)

These conventions are *commonly accepted amateur practice* (not rules)

SIDEBAND	FREQUENCY BAND IN METERS								
USB			60		20	17	15	12	10
LSB	160	75/80		40					

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Digital Voice

Relatively new on HF bands

Operator's voice converted to and from a digital stream via modem or sound card. Modem connects to a regular SSB transceiver

Fidelity comparable to regular SSB signals, but less affected by fading

Most popular digital voice modes: FreeDV and protocol developed by G4GUO

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Image Modes

Image mode transmissions on HF encode photos and graphics to tones

These tones are reconstructed as an image on a display

Allowed on same frequencies as voice, except for 60 meters

Most common image mode: *Slow-scan television* (SSTV)

Called *slow* because each image takes several seconds

Fast-scan amateur television (ATV) allows full motion video

Restricted to 432 MHz and higher frequency bands (due to wide bandwidth)

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HF Receiving

- Exchange signal reports at the beginning of a contact. Adjust controls, frequencies, procedures, etc. according to conditions
- Also report any QRN (static) or QRM (interference) present.
- "RST" Readability, Strength, and Tone (CW only). The higher the number the better (e.g., 489, 579, 599, or 5NN) - Readability (1-5) – Strength (1-9) – Tone (1-9)
- On CW, add "C" to indicate that a signal is "chirpy" or unstable – example: 579C (more on CW soon)

C:\Users\ai2n\Videos\General Course - Videos\Chirp - HA5LV.wmv

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Take Quiz 3

G2A01 - Which mode is most commonly used for voice communications on frequencies of 14 MHz or higher?

A. Upper sideband

B. Lower sideband

C. Suppressed sideband

D. Double sideband

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G2A02 - Which mode is most commonly used for voice communications on the 160-, 75-, and 40-meter bands?

A. Upper sideband

B. Lower sideband

C. Suppressed sideband

D. Double sideband

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B. Lower sideband

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G2A03 - Which mode is most commonly used for SSB voice communications in the VHF and UHF bands?

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G2A04 - Which mode is most commonly used for voice communications on the 17- and 12-meter bands?

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G2A05 - Which mode of voice communication is most commonly used on the HF amateur bands?

A. Frequency modulation

B. Double sideband

C. Single sideband

D. Single phase modulation

G2A05 - Which mode of voice communication is most commonly used on the HF amateur bands?

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C. Single sideband

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G2A06 - Which of the following is an advantage of using single sideband, as compared to other analog voice modes on the HF amateur bands?

A. Very high-fidelity voice modulation

B. Less subject to interference from atmospheric static crashes

C. Ease of tuning on receive and immunity to impulse noise

D. Less bandwidth used and greater power efficiency

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G2A07 - Which of the following statements is true of single sideband (SSB)?

A. Only one sideband and the carrier are transmitted; the other sideband is suppressed

B. Only one sideband is transmitted; the other sideband and carrier are suppressed

C. SSB is the only voice mode authorized on the 20-, 15-, and 10-meter amateur bands

D. SSB is the only voice mode authorized on the 160-, 75-, and 40-meter amateur bands

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D. SSB is the only voice mode authorized on the 160-, 75-, and 40-meter amateur bands

G2A09 - Why do most amateur stations use lower sideband on the 160-, 75-, and 40-meter bands?

A. Lower sideband is more efficient than upper sideband at these frequencies

B. Lower sideband is the only sideband legal on these frequency bands

C. Because it is fully compatible with an AM detector

D. It is commonly accepted amateur practice

G2A09 - Why do most amateur stations use lower sideband on the 160-, 75-, and 40-meter bands?

A. Lower sideband is more efficient than upper sideband at these frequencies

B. Lower sideband is the only sideband legal on these frequency bands

C. Because it is fully compatible with an AM detector

D. It is commonly accepted amateur practice

G2C07 - When sending CW, what does a "C" mean when added to the RST report?

A. Chirpy or unstable signal

B. Report was read from an S meter rather than estimated

C. 100 percent copy

D. Key clicks

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G2C10 - What does the Q signal "QRN" mean?

A. Send more slowly

B. Stop sending

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G2D11 - Why are signal reports typically exchanged at the beginning of an HF contact?

A. To allow each station to operate according to conditions

B. To be sure the contact will count for award programs

C. To follow standard radiogram structure

D. To allow each station to calibrate their frequency display

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HF Transmitting – Phone

Push-to-talk – Just like on VHF/UHF

Voice-operated-transmit (VOX)

- Hands-free operation

- Possible false triggering due to background noise

- Adjust VOX gain, delay, and anti-VOX controls to minimize problems

HF Phone Procedures and Abbreviations

CQ, Break, Over, Clear

Q-Signals – Heard on SSB/FM even though they were designed as shorthand for CW

Avoid “CB Talk” and 10-codes (“10-4”)

- Plain speech is more effective

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HF CW Transmitting

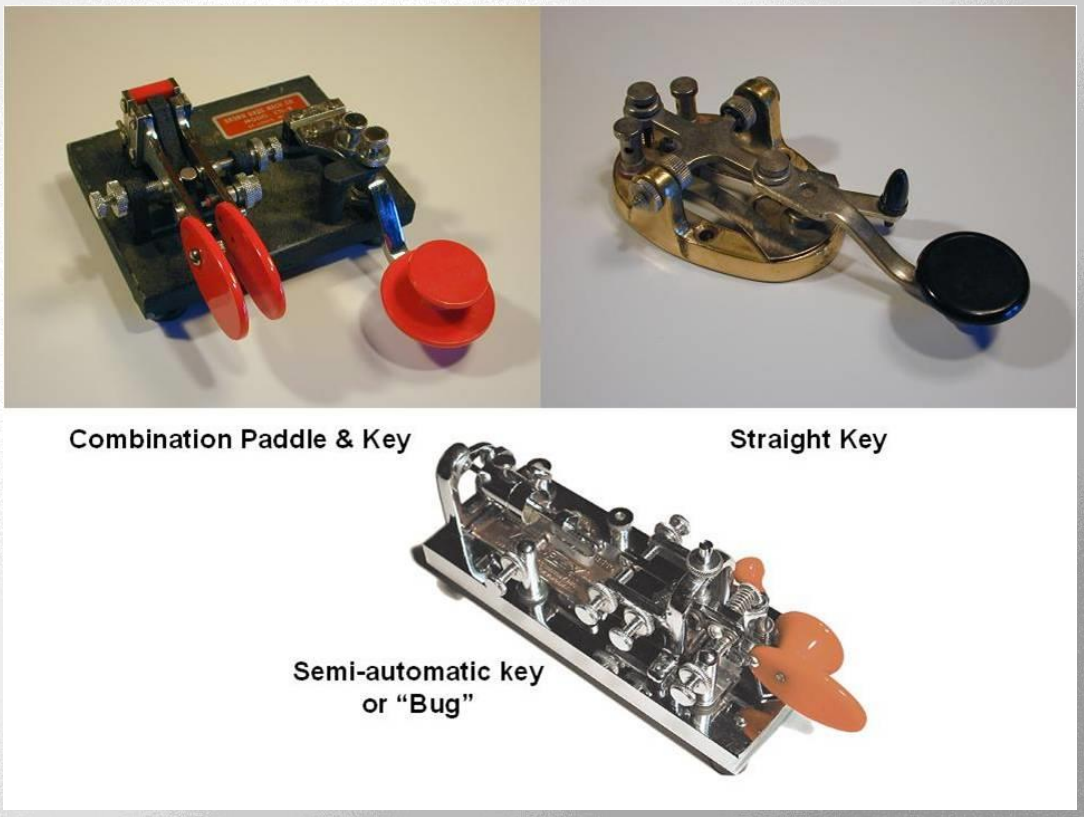
Morse code is alive and well in Amateur Radio

Though usually from at the low end of each band,

CW operation is permitted throughout all amateur bands

Morse ops use:

- Straight keys
- Iambic paddles
- Bugs
- Computers



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CW Mode

- CW (Morse code) – Found at the bottom of each HF band, but allowed to be transmitted on almost any amateur frequency
- Speeds vary from 5 to 50 WPM - answer a CQ at the fastest speed you can copy, but NOT faster than the CQ
- Most CW ops will slow down if you send “QRS” (send slower)
- An electronic keyer can be used for automatic generation of strings of dots and dashes for CW operation.

QSK

Most radios offer full break-in (QSK) capability;
the transmitting station can receive between transmitted code characters and elements

The video shows a series of simulated dashes being sent.
Another signal can be heard between dashes.

C:\Users\ai2n\Videos\General Course - Videos\QSK_Demo.wmv

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HF CW Transmitting

- **Zero beating** is adjusting your transmit frequency to the frequency of a received signal, producing the same audio tone

A CW signal will be heard. Depressing the SPOT key emits a tone to compare your transmit frequency to the receive frequency.

C:\Users\ai2n\Videos\General Course - Videos\Zero_Beat_Demo.wmv

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CW Procedures / Abbreviations

- *Procedural signals* like “K” (over) control the flow of the contact
- *Prosigns* are two letters run together as a single Morse character, written with an overscore

$\overline{\text{AR}}$ End of formal Message

$\overline{\text{SK}}$ End of Communication

$\overline{\text{BT}}$ Separation (between message text and other information)

$\overline{\text{KN}}$ Listening only for specific station(s)

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CW Procedures / Abbreviations

- Abbreviations:
  - WX – Weather
  - CUL – See you later
  - TU – Thank you
  - 73 – Best wishes
  - AGN – Again
  - FB - Fine Business (OK)
  - DE - From

Q-Signals:

QRN – Atmospheric noise (static)

QRM – Man-made noise

QRV – Ready to receive

QSL – Acknowledge receipt

QRL – Frequency is in use

QRP – Low power, 5 W or less

Q-Signals can be a statement or made into a question by adding ?

Example: QSL? QSL

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Emergency Operation

- Events around world have demonstrated the value of Amateur Radio in times of disaster
- All Amateur Radio operators should be familiar with emergency rules and procedures so they can contribute effectively when normal communications are unavailable
- Emergency communications in any form take priority over all other types of amateur communication - it's why we exist

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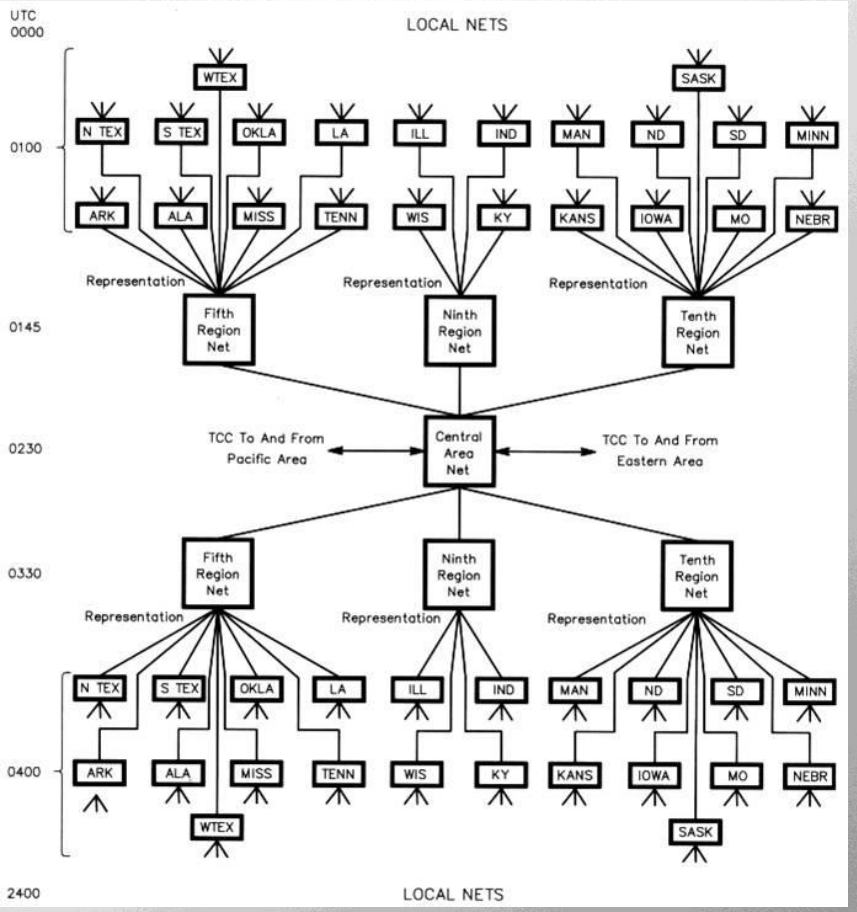
Nets and Emergency Operation

- Three basic net (Network) types:
- Traffic (relaying messages – shown at right)
- Emergency communications
- Social or topical



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Nets and Emergency Operation

- Net Control Station (NCS) – the operator in charge of a directed net.
- The NCS runs the net. A “directed net” means all contacts are routed through the NCS.
- Joining and leaving a net – checking in and checking out.
- Before joining a net, listen for a while to learn the procedures of the net.

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Emergency Operation

ARES – Amateur Radio Emergency Service is organized by the American Radio Relay League

- Any licensed ham can be a member
- ARRL membership is required for official appointments
- Teams are lead by Emergency Coordinators (ECs) at the local level, District Emergency Coordinators (DECs) in larger areas like counties
- Leadership is handled by the ARRL Section Emergency Coordinator (SEC)
- The mission is to provide communication assistance to local and regional government and relief agencies

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Emergency Operation

- RACES – Radio Amateur Civil Emergency Service is sponsored through government agencies (City, County, State)
  - RACES is a specific part of the Amateur Service and is governed by the FCC rules to provide essential communications for State and local governments in time of emergency
  - To participate, you must register with a local Civil Defense or Emergency Management organization
  - ***Only*** an FCC licensed amateur may be a control operator of a RACES station
  - RACES training drills/tests maybe conducted for a maximum of 1 hour per week without special authorization

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Emergency Operation

- The FCC rules state that during an emergency or disaster, an amateur station may make "transmissions necessary to meet essential communication needs and to facilitate relief actions."
  - Routine emergency communications are conducted on any frequencies authorized to the station control operator.
  - There are exceptions to the rules that allow amateurs to use any means and any frequency necessary to provide *emergency* communication.

Emergency Operation

- FCC Rule Exception
- When there is an immediate threat to the safety of life or property
- “No provision of these rules prevents the use by an amateur station of any means of radio communication at its disposal to provide essential communication needs…”

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Distress Calls

- What do you do if you hear a distress call?
  - Immediately suspend your existing contact
  - Immediately contact the station calling for help to let them know that you hear them
  - Do your best to obtain assistance for the station in distress

Distress Calls

- Stand by to receive:
  - The location of the emergency
  - The nature of the emergency
  - What assistance is required
  - Relay the information to the proper authorities and stay on frequency for further information or until help arrives

Distress Calls

- What do you do if **you** are the station in distress?
  - On a voice mode say “Mayday Mayday Mayday” or on CW send “SOS SOS SOS” followed by “any station come in please”
  - Identify your transmission with your call sign
  - Give your location with enough detail to be located
  - State the nature of the situation/emergency
  - Describe the type of assistance you require and provide any other pertinent information

Distress Calls

- Unidentified transmissions outside the amateur bands are permitted if required to provide the necessary emergency communications
  - ***Use whichever frequency has the best chance of communicating the distress message***
  - The same rules apply to you if you hear a distress call - answer if you can, whatever the frequency
  - The risk of immediate loss of life and property overrides rules for normal operation

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Take Quiz 4

G2A10 - Which of the following statements is true of VOX operation versus PTT operation?

A. The received signal is more natural sounding

B. It allows "hands free" operation

C. It occupies less bandwidth

D. It provides more power output

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G2B11 - How often may RACES training drills and tests be routinely conducted without special authorization?

A. No more than 1 hour per month

B. No more than 2 hours per month

C. No more than 1 hour per week

D. No more than 2 hours per week

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G2C01 - Which of the following describes full break-in CW operation (QSK)?

A. Breaking stations send the Morse code prosign "BK"

B. Automatic keyers, instead of hand keys, are used to send Morse code

C. An operator must activate a manual send/receive switch before and after every transmission

D. Transmitting stations can receive between code characters and elements

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G2C02 - What should you do if a CW station sends "QRS?"

A. Send slower

B. Change frequency

C. Increase your power

D. Repeat everything twice

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G2C03 - What does it mean when a CW operator sends "KN" at the end of a transmission?

A. No US stations should call

B. Operating full break-in

C. Listening only for a specific station or stations

D. Closing station now

G2C03 - What does it mean when a CW operator sends "KN" at the end of a transmission?

A. No US stations should call

B. Operating full break-in

C. Listening only for a specific station or stations

D. Closing station now

G2C05 - What is the best speed to use when answering a CQ in Morse code?

A. The fastest speed at which you are comfortable copying, but no slower than the CQ

B. The fastest speed at which you are comfortable copying, but no faster than the CQ

C. At the standard calling speed of 10 wpm

D. At the standard calling speed of 5 wpm

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G2C06 - What does the term "zero beat" mean in CW operation?

A. Matching the speed of the transmitting station

B. Operating split to avoid interference on frequency

C. Sending without error

D. Matching the transmit frequency to the frequency of a received signal

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G2C08 - What prosign is sent to indicate the end of a formal message when using CW?

A. SK

B. BK

C. AR

D. KN

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G2C09 - What does the Q signal "QSL" mean?

A. Send slower

B. We have already confirmed the contact

C. I have received and understood

D. We have worked before

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B. There is interference on the frequency

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G4A10 - What is the function of an electronic keyer?

A. Automatic transmit/receive switching

B. Automatic generation of dots and dashes for CW operation

C. To allow time for switching the antenna from the receiver to the transmitter

D. Computer interface for PSK and RTTY operation

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G2B02 - What is the first thing you should do if you are communicating with another amateur station and hear a station in distress break in?

A. Inform your local emergency coordinator

B. Acknowledge the station in distress and determine what assistance may be needed

C. Immediately decrease power to avoid interfering with the station in distress

D. Immediately cease all transmissions

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G2B09 - Who may be the control operator of an amateur station transmitting in RACES to assist relief operations during a disaster?

A. Only a person holding an FCC-issued amateur operator license

B. Only a RACES net control operator

C. A person holding an FCC-issued amateur operator license or an appropriate government official

D. Any control operator when normal communication systems are operational

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Next Week - Chapter 3

Start learning to identify the bands, wavelength vs. frequency!