THE ARRL

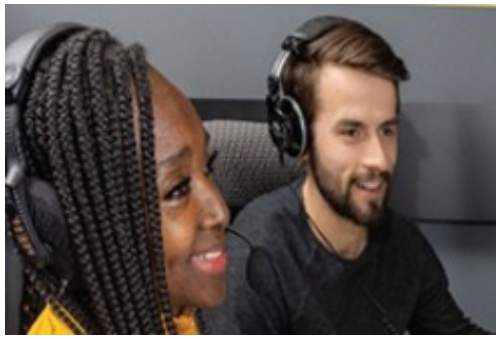
TENTH EDITION

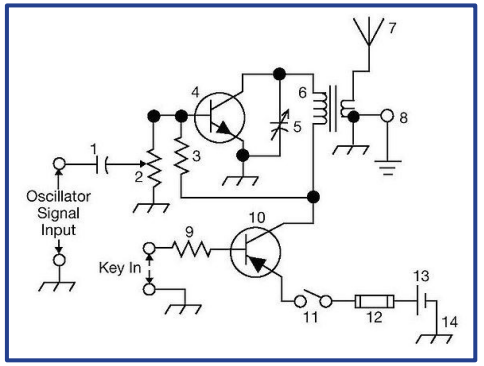
GENERAL

LICENSE COURSE

FOR HAM RADIO

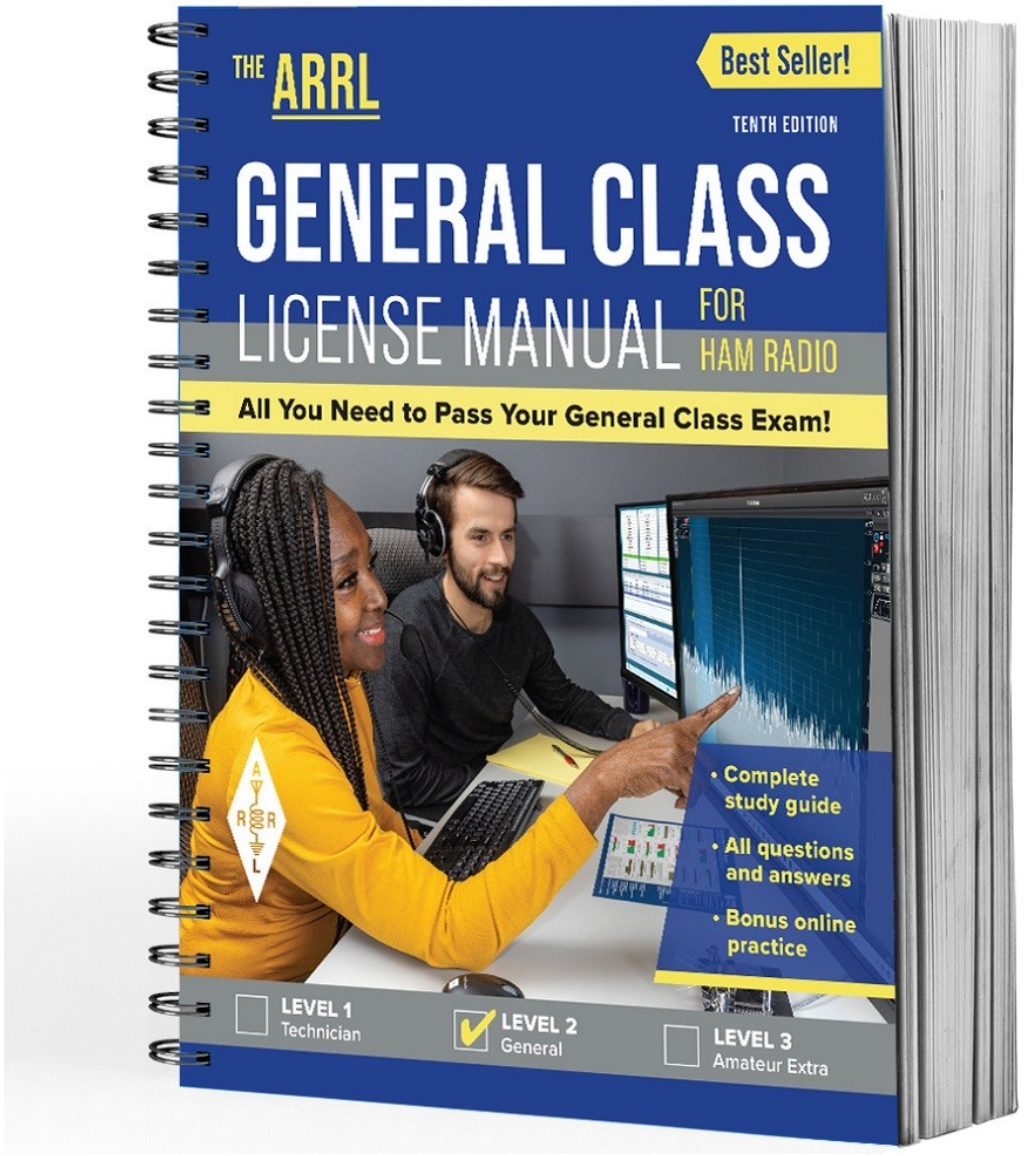
All You Need to Pass Your General Class Exam!





Resource & Reference

www.arrl.org/shop/Licensing-Education-and-Training



Chapter 2 Part 1 of 1

ARRL General Class
Procedures and Practices
Sections 2.1, 2.2

HF Operating Techniques, Emergency Operation

Section 2.1
HF Operating Techniques

- Technician class operators focus skills for VHF and higher bands
  - Although 10 meters (voice) and 80, 40, and 15 meters (CW) are HF options for technicians
- General class operators have the advantage of using HF
  - A General license opens up many more frequencies, modes, and activities
- Almost everything you know about operating courtesy and good practices from VHF and UHF can be applied to HF

Selecting a Frequency

RECOMMENDED SIGNAL SEPARATION	
CW:	150-500 Hz
SSB:	2-3 kHz
RTTY:	250-500 Hz
PSK31:	150-500 Hz

- Check FCC Part 97 for frequency & mode restrictions
  - Refer to Band Plan in Chapter 1
- Remember that no group or amateur has priority access to any frequency except in the case of emergency communications
- On HF, perfectly clear channels are rare
- Goal: Find a frequency that minimizes interference to adjacent stations (and, vice versa) – see recommended signal separation table …

Selecting a Frequency (cont.)

- Once a frequency is found, check if another station is using it …
  - Listen for 10-20 seconds … then …
    - Voice Mode: *Is this frequency in use? This is [your call].*
    - CW/Digital Modes: *QRL? DE [your call].*
- Frequency selection summary …
  - Confirm frequency is authorized for your license privileges
  - Follow the band plan under normal circumstances
  - Listen to avoid interfering with ongoing communications

Split / Dual Frequency Operation

- When a rare or interesting station is on the air with many calling stations, it's common to operate *split* …
  - Set transceiver to listen on one frequency and transmit on another
  - Allows for more orderly/effective operating
  - Doesn't work on all transceivers
  - Referred to as a *dual-VFO feature* on a transceiver

More Info … HF Operating Techniques

- HF equipment is designed for continuous tuning
- The control used for continuous tuning is called a *VFO* or *Variable Frequency Oscillator*
  - The minimum frequency change is called *step size* or *step rate*
- For short-range contacts, use 80 or 40 meters
  - Using long-distance bands for short-range contacts needlessly occupies radio spectrum space (signal will be heard over much wider range than you're using)
- Longer range contacts, use 30 through 10 meters

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
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**.

Band-by-Band Frequency Guide

General Class License Manual, Tenth Edition, Page 2-3

Very Common Q Codes

Memorize these!

Code	Meaning
QRL	Are you busy? / I am busy.
QSO	Can you communicate? / I can communicate. (Sometimes “conversation”)
QRP	Shall I decrease transmit power? / Decrease transmit power.
QRO	Shall I increase transmit power? / Increase transmit power.
QSL	Can you receive? / Confirm received.
QRM	Are you bothered by non-natural noise/interference? / I am bothered …
QRN	Are you bothered by natural noise/interference/static? / I am bothered …
QRV	Are you ready to receive? / I am ready …
QRZ	QRZ? (Who is calling me?) / QRZ _ _ _ _ _ (QRZ _ _ _ _ _ is calling you.)
QTH	What is your location? / My location is.

PRACTICE QUESTIONS

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

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

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

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

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

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

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?”

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

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

Making Contacts

- Calling CQ is rare* on VHF/UHF FM channels, but the method many contacts are initiated on HF
- To call CQ on phone/voice …
  - "CQ CQ CQ, this is [your call repeated a few times **with phonetics**]"
    - Example (KØILP): *CQ CQ CQ, this is kilo-zero-india-lima-papa, kilo-zero-india-lima-papa*
  - Pause for a response
  - If no response, repeat your CQ
- To call CQ on CW …
  - "CQ CQ CQ DE [your call **without** phonetics]"

** Calling CQ is rare on VHF/UHF, but acceptable to use.*

Making Contacts, CQ Variations

- CQ DX (DX means *distant stations*)
  - If you hear CQ DX from a station on the US mainland, it means the person calling is looking for stations outside the lower 48 states
  - On HF, it generally refers to any station outside the caller's country
- During CQ contests, you'll generally hear …
  - "CQ Contest", "CQ test", or "CQ from special event station"
- CQ for stations from certain areas …
  - "CQ North America" or "CQ California"

Joining an Ongoing QSO (Contact)

- Joining a QSO (also called *breaking in*) is common
- On phone/voice, just say your call sign
- On CW / digital modes, send *BK* (break) followed by your call sign
- Same rules apply during contests and competitive events

DX Windows

- Originally designed to give operators from countries with restricted privileges band space to make DX contacts outside their countries
- Only a few kHz wide on some bands
- Now less common with increasing world-wide frequency allocations … but …
- 50.1 to 50.125 MHz is the place to listen for long-distance contacts outside the contiguous 48 states

Nets & Schedules

- There are many on-the-air activities scheduled in advance
  - Although no individual has exclusive access to frequencies, we should be courteous and accommodating
- Avoid scheduling contacts on national calling frequencies and popular bands
- Check contesting calendars on ARRL.org and other sites
- If you're "net control" and discover the net's chosen frequency to be occupied, find a nearby clear frequency or change to the net's backup frequency

Logging Contacts

- No longer required, but most amateurs keep a log to verify contacts for awards and to record items of interest – see *NOTE* below
- Typical log: time, date, frequency or band, mode of the contact (USB, PSK, etc.), call sign, signal reports, names, and equipment used
- Establishes identify of control operator and can be useful in providing info requested by the FCC
- *NOTE: When operating on 60 meters with an antenna other than a dipole, FCC requires you to keep a record of antenna gain calculations or manufacturer's data (ensures meeting 100 W ERP restrictions).*

Managing Interference

- Interference is going to occur on HF …
  - Frequencies aren't channelized
  - There are many amateurs using the frequencies
  - Occurs due to crowding, propagation, personal choice, atmospheric conditions, and consumer electronics
- Learning how to make contacts under these conditions is part of becoming a good operator

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)

Avoiding Interference

- Learn what bands are crowded and when
- Learn characteristics of each band (propagation & noise)
- Learn how to use your equipment (understand strengths & weaknesses)
- Check published calendars for major operating events

Reacting to Interference

- Be flexible … no one has a claim to any frequency
- Have a back-up plan (especially for scheduled events … nets, etc.)
  - Do this in advance!
- Keep a cool head … don't allow *harmful* interference to turn into *deliberate* interference!

PRACTICE QUESTIONS

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

G1C04 (A) [97.303(i)] Page 2-7

What is the recommended way to break in to 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

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

G2A11 (C) Page 2-5

What is the voluntary band plan restriction for US stations transmitting within the 48 contiguous states in the 50.1 MHz to 50.125 MHz band segment?

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

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

G2B10 (B) Page 2-7

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

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

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 per normal FCC regulations
D. All these choices are correct

Modes

Amateurs use many different modes of communication. The invention of these various modes is a example of amateur radio fulfilling its mission to "contribute to the state of the radio art." (per Part 97.1b)

- CW (*continuous wave*) … found in lower ranges for each HF band. However, CW operation is permitted throughout all amateur bands.
- AM & SSB (single-side band)
  - SSB is the most common voice mode or phone signal
  - Has displaced AM as the preferred HF voice modulation method
  - SSB signals use less spectrum space than AM (3 kHz vs. 6 kHz … this increases efficiency … results in SSB having a greater range than AM

Modes (cont.)

- USB vs. LSB (upper and lower side band)
  - Good amateur practices is to use USB above 9 MHz (20 thru 10 meters) and LSB elsewhere except on 60 meters
    - USB is used on VHF and UHF
- FM is generally not used on HF because higher noise hurts intelligibility
  - Exception: FM repeaters can be found on the higher frequencies of 10 meters (above 29 MHz) where cross-continent and DX contacts can be made when the band is open

Modes (cont.)

- 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 (Charles Brain)

Modes (cont.)

- Digital Modes …
  - Packet radio common on VHF and UHF to exchange digital data, but also common on HF
  - FT8: Most popular
  - FT8, PSK63 and PSK31: Effective at low power levels … all widely used
  - RTTY: Oldest, and still common (*radioteletype*)
  - PACTOR or WINMOR: Used for semi-automatic and automatic messaging for small files

More info on digital modes in Chapter 6

Modes (cont.)

- Image Modes
  - Image mode transmissions on HF encode photos & 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)

Mode Comparison

More details in Chapters 5 & 6

Table 2.2
Mode Comparison

Mode	*Bandwidth*	*Examples*	*Data Rate*	*Notes*
CW	Up to 150 Hz		Up to 60 WPM	
AM	6 kHz			Can be higher fidelity than SSB
SSB	3 kHz			
Narrow Bandwidth HF Digital	Up to 500 Hz	RTTY, PSK31 JT65 or FT8	Up to 100 WPM	Keyboard-to-keyboard
Wide Bandwidth HF Digital	Up to 2.3 kHz	PACTOR	Up to 5,200 bit/s	Keyboard-to-keyboard and file transfer
VHF/UHF Digital	Up to 100 kHz	Packet, D-STAR SystemFusion, Digital Mobile Radio (DMR)		Max bandwidth varies by band
Narrow Bandwidth Image	3 kHz max on HF	SSTV		
Video (full motion)	6 MHz max	NTSC, HDTV		UHF and microwave only

PRACTICE QUESTIONS

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

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

G2A02 (B) Page 2-10

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

A. Upper sideband
B. Lower sideband
C. Suppressed sideband
D. Double sideband

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

A. Upper sideband
B. Lower sideband
C. Suppressed sideband
D. Double sideband

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

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

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

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

HF Receiving

- On VHF, FM receivers have 3 basic controls …
  - Frequency (channel), squelch, volume
- SSC/CW receivers have additional controls to accommodate non-channelized, continuous-tuning operation (must be able to receive signals in the presence of noise and interference from adjacent channels). Examples …
  - *Selectivity*: Ability to discriminate between closely-spaces signals
  - *Sensitivity*: Ability to detect a signal

Examples of Additional HF Transceiver Controls

*Natural or atmospheric noise (QRN) is much more common on HF than VHF/UHF. This natural noise includes some man-made sources (sparks from motors & generators). Hence, the importance of **SELECTIVITY**.*

Figure 2.3 — HF transceivers have a variety of controls to help minimize interference on crowded bands. These may include notch filters, passband filters, audio peak filters and similar features.

Signal Reporting

- Exchanged between stations at beginning of a contact (lets stations know how well they're being received so adjustments can be made)
- Most common is *RST*
  - *R*eadability: Scale of 1 to 5 (5 = best)
  - *S*trength: Scale of 1 to 9 (9 = best)
  - *T*one: Also 1 to 9 scale. Only used for CW and digital mode contacts.
    - Indicates signal purity; Values less than 9 indicate transmitter problems
  - A *C* added after RST indicates an unstable signal or *chirp*

HF Receiving … More Information

- HF receivers use sharp filters to reject unwanted signals
- Because HF operation is not channelized, you'll encounter signals close enough in frequency to be audible as low- or high-pitched speech fragments. This is *QRM interference.*
- A steady tone from a station tuning up or a broadcast carrier can be rejected by a *notch* filter

PRACTICE QUESTIONS

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

What does the Q signal “QRN” mean?

A. Send more slowly
B. Stop sending
C. Zero beat my signal
D. I am troubled by static

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

HF Transmitting – PHONE

- Putting transceiver into transmit mode is called *keying* the transmitter
  - The PTT (*push-to-talk*) button works the same as on FM
  - Foot switches are often used during busy operating periods
- Some HF operators use *voice-operated transmit* or *VOX*
  - Allows hands-free operation
  - Common for mobile operators

HF Transmitting – **CW**

- CW operators use *prosigns* (2-letter shortcuts)
  - Example: $\overline{\text{AR}}$ (means *End of Message*)
- Respond to a CQ at the fastest speed you're comfortable, up to the speed of the CQ (sending station)
  - Reply with QRS to request sender slow down (QRQ = speed up!)
- As with voice, give call sign every 10 minutes and end of contact

CW (cont.)

- Most CW operators begin by using a *straight key* but most graduate to an *electronic keyer*
- The keyer is operated by a *paddle* to automatically generate the strings of Morse code elements — dots and dashes
- Under some circumstances, it is more convenient to be able to hear what is going on between Morse characters
  - Some radios include a full break-in option in which the radio switches between transmit and receive … full break-in is referred to as *QSK*

CW (cont.)

- When communicating, try to match your transmitting frequency with the received signal (called *zero beat*)
- Once you are in contact with another station, the prosign *KN* is used instead of *K* to prevent other stations from breaking in during the contact
  - "Only the specific station or stations I am contacting should respond."
  - Prosign *SK* ends the message
- Other useful CW Q codes:
  - QRV = I'm ready to receive
  - QSL = I acknowledge receipt

CW Additional Information

- FISTS: www.fists.org
- CWOps: www.cwops.org
- ARRL: www.arrl.org/cw-mode
- Learn CW Online: https://lcwo.net

PRACTICE QUESTIONS

Which of the following statements is true of voice 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

G2A10 (B) Page 2-13

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

G2B11 (C) [97.407(d)(4)] Page 2-17

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

What should you do if a CW station sends “QRS?”

A. Send slower
B. Change frequency
C. Increase your power
D. Repeat everything twice

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 (C) Page 2-14

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

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

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

A. SK
B. BK
C. AR
D. KN

G2C08 (C) Page 2-14

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

What does the Q signal “QRV” mean?

A. You are sending too fast
B. There is interference on the frequency
C. I am quitting for the day
D. I am ready to receive

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

Section 2.2
Emergency Operation

- Amateurs should be familiar with emergency rules and procedures
- See Table 2.4 (General Class License Manual, Pages 2-16, 2-17)
  - FCC 47 CFR § 97.401 Operating during a disaster
  - FCC 47 CFR § 97.403 Safety of life and protection of property
  - FCC 47 CFR § 97.405 Station in distress
  - FCC 47 CFR § 97.407 Radio amateur civil emergency service

ARES & RACES

Amateur Radio two primary emergency response organizations

- ARES = Amateur Radio Emergency Services (sponsored by ARRL)
  - Mission: provide communications assistance to local and regional government and relief agencies
  - www.arrl.org/ares
- RACES (sponsored by FEMA)
  - Mission: provide essential communications for State and local governments in time of emergency
  - Only a licensed amateur may be the control operator of a RACES station

Distress Calls

- If you receive a call for help …
  - Immediately suspend your existing contact
  - Immediately acknowledge to the station calling for help
  - Stand by to receive the location of the emergency and the name of the assistance required
  - Relay the info to the proper authorities and stay on frequency

Distress Calls (cont.)

- If you're the station making the distress call …
  - On voice mode, say *MAYDAY MAYDAY MAYDAY*. On CW or digital send *SOS SOS SOS* followed by *Any station come in please*.
  - Identify the transmission with your call sign
  - State your location and the nature of the situation
  - Describe the type of assistance required
- FCC 47 CFR § 97.405 allows the distress station to use ANY means of communication available, even frequencies, mode, or power level outside your normal privileges

PRACTICE QUESTIONS

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

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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END OF CHAPTER 2 PART 1 OF 1

Slides created by …

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Feel free to contact me if you find errors or have suggestions for improvement.