

# Ham Radio Ancient Lore

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# Wisdom from the ages



- Lore (noun): *“a body of traditions and knowledge on a subject or held by a particular group, typically passed from person to person by word of mouth.”*
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# RADIO ETIQUETTE



- LISTEN before transmitting – always.
  - If you're using a signalink or digital – YOU STILL need to listen.
  - Don't transmit if someone else is transmitting unless you're on a narrow waveform and they are WAY OFF. (E.g. FT8 JS8 etc.
  - LEARN the sounds of common signals.
  - IGNORE radio freq noise from computers – move away.
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# YOUR RADIO

- Read **AT LEAST SOME** of the manual....
- Be familiar with its inputs and outputs
- You probably want to **DOWNLOAD** it to your computer for a deployment. **YOU MIGHT NEED IT.**

# Operating

- Q Codes set amateur radio apart from “10-codes”
- <https://www.arrl.org/files/file/Get on the Air/Comm w Other Hams-Q Signals.pdf>
- QSO
- QSY
- QRM
- QRN

## Communicating with Other Hams

### Contact Basics: Good Amateur Practices

#### Q-Signals

Q-signals are a system of radio shorthand as old as wireless and developed from even older telegraphy codes. Q-signals are a set of abbreviations for common information that save time and allow communication between operators who don't speak a common language. Modern ham radio uses them extensively. The table below lists the most common Q-signals used by hams. While Q-signals were developed for use by Morse operators, their use is common on phone, as well. You will often hear, "QRZed?" as someone asks "Who is calling me?" or "I'm getting a little QRM" from an operator receiving some interference or "Let's QSY to 146.55" as two operators change from a repeater frequency to a nearby simplex communications frequency.

Q-Signals		ITU Phonetic Alphabet		
Abbr.	Questions	Letter	Word	Pronunciation
QRG	Your exact frequency (or that of _____) is _____ kHz. Will you tell me my exact frequency (or that of _____)?	A	Alfa	AL FAH
QRL	I am busy (or I am busy with _____). Are you busy? Usually used to see if a frequency is busy.	B	Bravo	BRAH VOH
QRM	Your transmission is being interfered with _____ (1. Nil; 2. Slightly; 3. Moderately; 4. Severely; 5. Extremely.) Is my transmission being interfered with?	C	Charlie	CHAR LEE
QRN	I am troubled by static _____ (1 to 5 as under QRM). Are you troubled by static?	D	Delta	DELL TAH
QRO	Increase power. Shall I increase power?	E	Echo	ECK OH
QRP	Decrease power. Shall I decrease power?	F	Foxtrot	FOKS TROT
QRQ	Send faster (_____ wpm). Shall I send faster?	G	Golf	GOLF
QRS	Send more slowly (_____ wpm). Shall I send more slowly?	H	Hotel	HOH TELL
QRT	Stop sending. Shall I stop sending?	I	India	IN DEE AH
QRU	I have nothing for you. Have you anything for me?	J	Juliet	JEW LEE ETT
QRV	I am ready. Are you ready?	K	Kilo	KEY LOH
		L	Lima	LEE MAH
		M	Mike	MIKE
		N	November	NO VEM BER
		O	Oscar	OSS CAH
		P	Papa	PAH PAH

- QRP
- QRO
- QRS
- QRT
- QRV
- QSB
- QSK

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- QST
  - QSY
  - QTH
  - If you're not **VERY** familiar with Q signals –  
**PRINT OUT A COPY** and keep it with your radio!

# Net CW Comms

- QND – net is directed (by callsign)
- QNE – net standby
- QNI – Net stations report in
- QNU – net has traffic for you
- QNV – Contact \_\_\_\_\_ here, Move to \_\_\_\_\_ for \_\_\_\_\_
- QNX - Excused from net
- <http://www.arrl.org/files/file/Public%20Service/fsd218.pdf>
- These are used more than you would expect....

# REAL QSK vs. “Semi”

- REAL QSK – sending station can be interrupted by merely a couple of “dits” and be asked to repeat (“AA generators”)
- SEMI BREAKIN – most people adjust so it doesn’t “fall out” between words because they hate hearing the relays click in and out
- REAL QSK has to be done with tubes or semiconductors, between receiver / transmitter
- Takes some getting used to. INCREDIBLY better than the single duplex moving of traffic.

# Jumping In

- Easy to do on CW or SSB because more than one signal can be heard simultaneously
- Much more difficult on FM – what you hear are heterodyning (mixing) of the two input signals.

# Zero-beating

- On CW if you can't match your transmitter's carrier to theirs and they are using a NARROW filter....you may never be heard!
- Takes some reflection....
- Helps if your SIDETONE freq matches your RECEIVER OFFSET.
- If you're going to try CW....learn how to do this!

# CONNECTORS

- The single most important thing to know how to solder or construct to save MONEY or prevent an outage.
- Power connectors
- Receiver audio connectors
- CW Key connectors
- Microphone connectors
- RF connectors
- Computer connectors

# Power connectors

- **Never** have hot MALE connectors sticking out of a device. Power generation side needs to be protected by physical insulation
- That's why the outdoor connector to ACCEPT a generator connection is male, not female!
- Avoid having screw terminals powered outside a power supply!
- **Always** know if a power supply is CURRENT LIMITED or not.
- ALWAYS have a fuse within 12-18" of a low impedance BATTERY....unless you prefer your wiring to catch fire.

# AC LINE Power Connectors

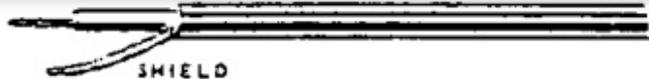
- Original – 2 prongs, equal (led to a lot of hot toaster cases and deaths)
- Polarized – the LARGER pole is supposedly “cold”
- Easy to foul up (see “original” outcome above)
- GROUNDED plugs – designed to avoid dead toaster owners
- DOUBLE INSULATED – specific manufacturing requirements, don’t need a ground wire

# Receiver Audio Connectors

- RCA Phono Plug- simple, cheap
- Lots of Hifi stereo's with this connector
- More recently, 1/8" plug, often "stereo"
- Headphones were ALWAYS 1/4" phone plugs – now may be 1/8" plug
- 1/4" plugs are very easy to wire
- **Watch for transient SHORT when inserting them** (impossible with RCA phono plug) This can destroy a badly designed IC output amplifier



# Heathkit Soldering Instructions



TAKING CARE NOT TO CUT THE OUTER SHIELD OF VERY THIN WIRES, REMOVE THE OUTER INSULATION.



TWIST THE SHIELD WIRES INTO ONE STRAND. REMOVE THE INNER INSULATION. THEN APPLY A SMALL AMOUNT OF SOLDER TO THE END OF THE INNER LEAD AND THE SHIELD.



INSERT THE INNER LEAD THROUGH THE PLUG AND WRAP THE SHIELD AROUND THE PLUG.

APPLY HEAT TO THE TIP OF THE PIN ONLY LONG ENOUGH FOR THE SOLDER TO BE DRAWN UP INTO THE PIN BY CAPILLARY ACTION.

SOLDER THE SHIELD ONTO THE PLUG.

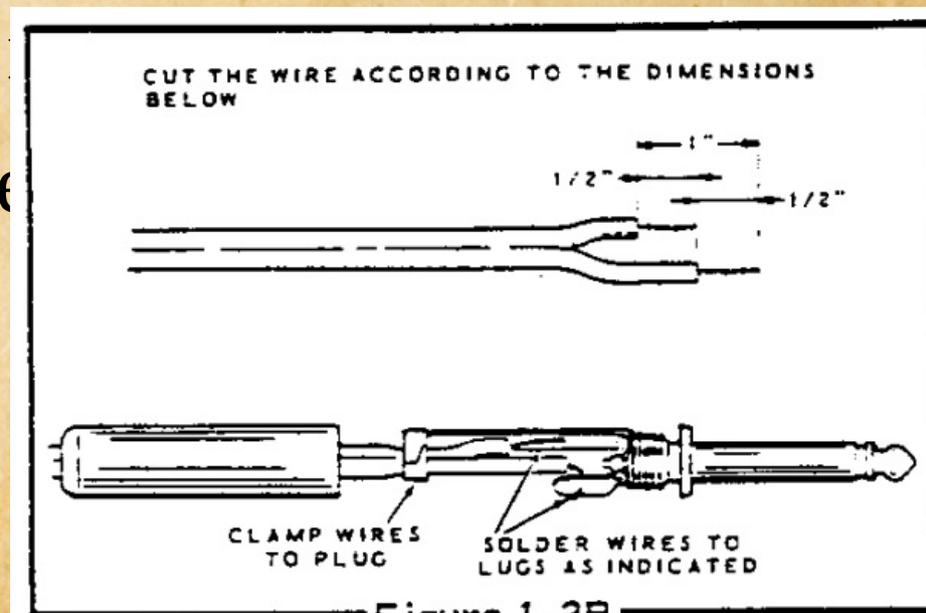
CUT OFF EXCESS WIRE FROM THE TIP OF THE PIN.



Newer commercial plugs (often with a screw on barrel) are much easier to solder together than the cheap simple connectors Heathkit had in their kits!

# CW Key Connectors

- Straight Keys always had  $\frac{1}{4}$ " phone jacks just like headphones
- Advent of the "bug" meant had to use "stereo" phone plugs/jacks
- Typically SLEEVE is ground
- Tip/Ring – depends on your
- Connectors are usually spelled



# Microphone Connectors

- *Much less uniformity*
- Original Heathkit 2-prong connector
- Often screwed in for security
- Sometimes ¼" phone plug
- Usually include the PTT switch
- Wiring NOT standardized
- More recently “modular” plugs, 4, 6, 8 pins
- 8 pin modular = RJ45



# Crimping modular connectors

- Special Crimpers needed for modular plugs – easily obtained online or at home depot.
- **RIGHT SIZE WIRE** going into the plug will crimp properly.
- Dealing with coax braid more of a problem....might need to extend with a simple wire.

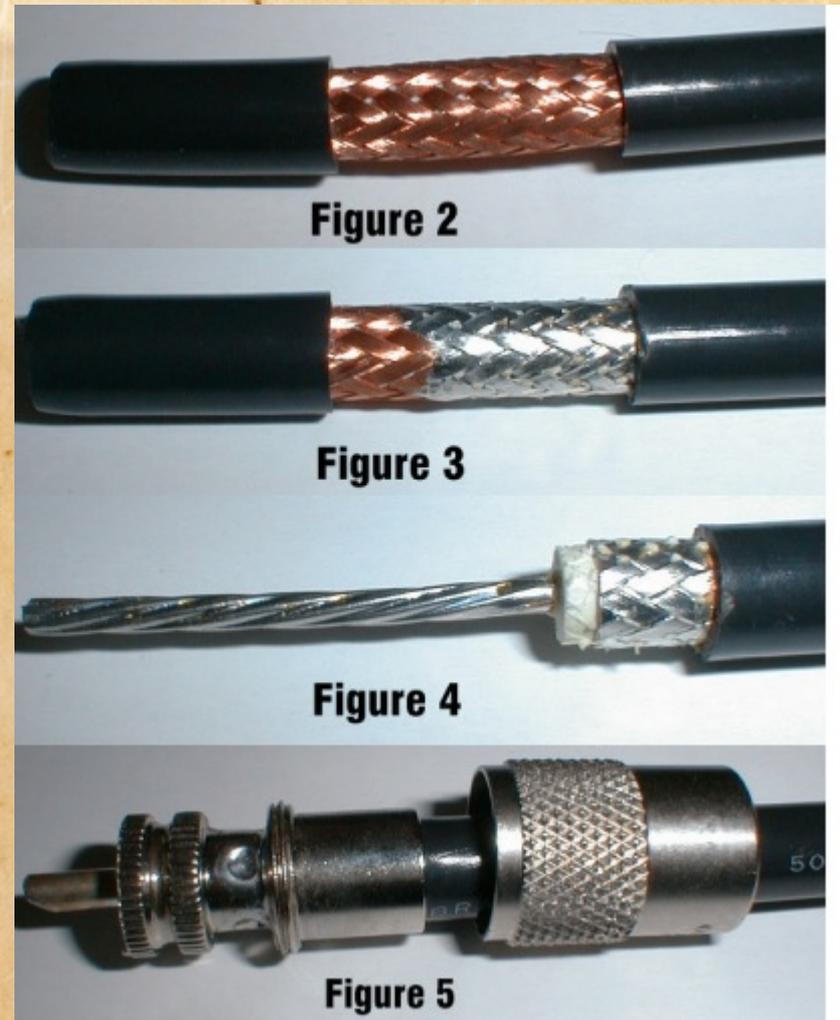
# RF Connectors

- “UHF” misnomer for PL-259 and SO-239. PL = plug; SO = socket
- “UHF” not really good at UHF – impedance bump
- BUT MAKES GOOD CONNECTION and physically secure. NOT waterproof
- Heathkit used RCA phono plug (cheaper?)
- QRP rigs often use BNC plugs (smaller)
- Ability to solder shield of a PL259 is a learned skill
- Recent creation of CRIMPED PL259's

# Power Supplies

- Old Days – power supply usually separate from vacuum tube rig. 800 volts for a typical 100 watt using 6146 or TV tubes
- 811A's needed 1500 volts; 572B's 2200 volts
- These days: everything runs on 13.8VDC (alternator voltage – can hit 14.5; based on lead acid battery chemistry vs. voltage)
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- You NEED TO BE ABLE to put on a PL259....even if poorly done --- for an emergency.
- You also need to be able to make one WELL to last for a long long time.



<http://www.nrharc.org/Downloads/Instructions%20for%20Attaching%20a%20PL-259.pdf>

ALTERNATIVE – solder pigtailed pulled through the holes!

# Connectors continued

- N connector – 50 ohms uninterrupted but lower power level. Good into the GHz
- SMA – smaller and confusing “male female” nomenclature “reverse”
- SMA made famous by Baofeng/other handhelds antenna connectors
- Threaded BNC
- F connectors (cable TV) – usually pushon



# AVOIDING RFI

- To reduce radio frequency interference to your digital operations, use the most “balanced” antenna you can, and use current-baluns rather than voltage baluns.
  - Off center and end-fed antennas are inherently unbalanced
- Connect radio equipment together by good short ground wires.
- Put Ferrite Beads on your cables IN and OUT of your Signalink, or on the USB cable to your radio

# Diagnosing RFI

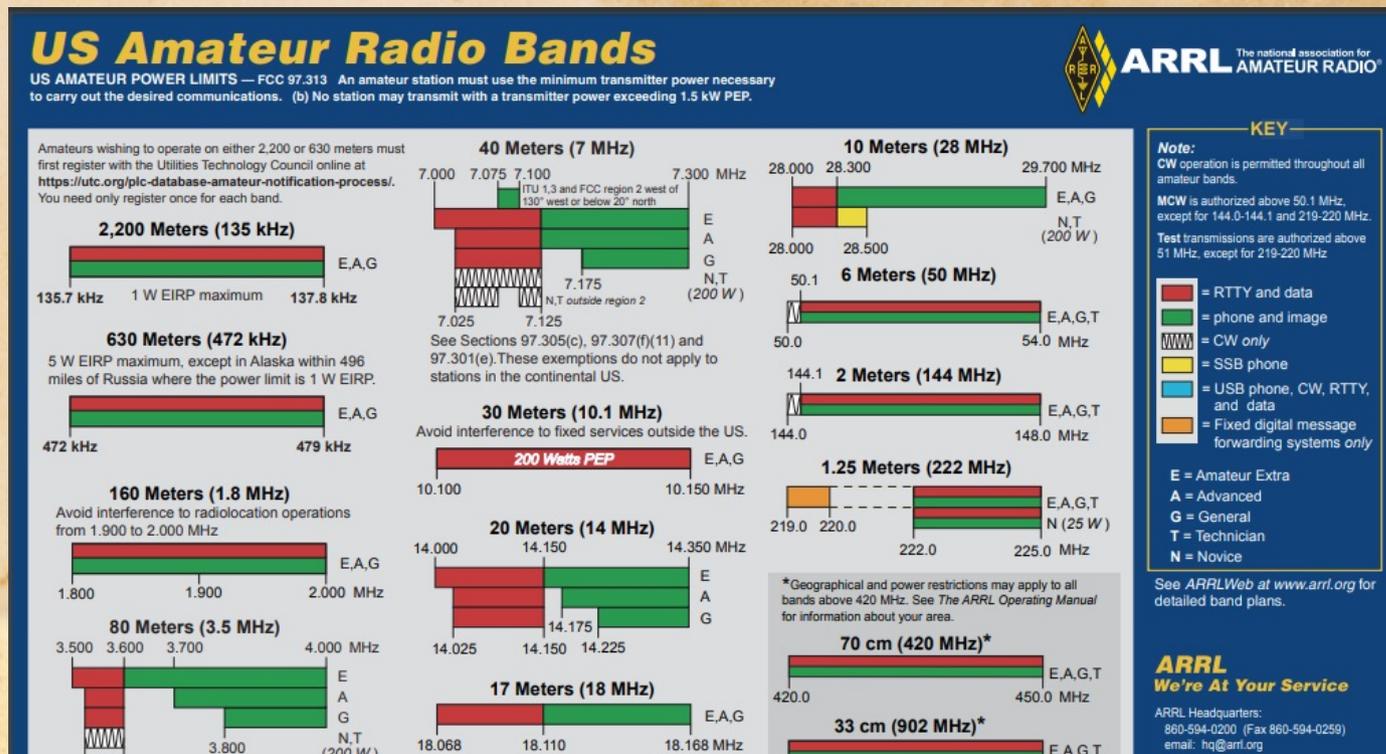
- If your transmitter LOCKS UP into transmit...you probably have RFI
- If the odd behaviors GO AWAY when you transmit at much lower power, or when you transmit into a dummy load....you are probably seeing RFI
- RFI is caused by common mode currents trying to make an “antennna” out of connections between your computer and radio

# UNDERSTAND bandwidths

- Do some study and learn what Upper sideband, lower sideband, AM, and FM, PSK and CW are really like!
- You'll benefit immensely

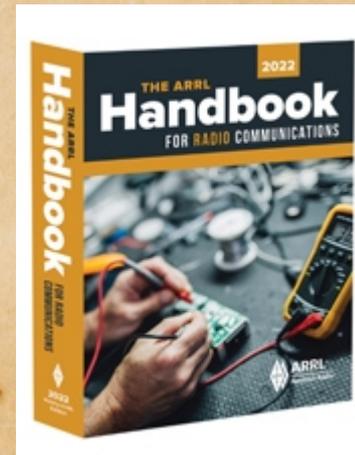
# Stay LEGAL

- Always keep a frequency chart handy and learn how to READ IT
- Stay AWAY from edges of bands or edges of license limitations.



# READ!

- You can learn a lot from QST articles, your local section newsletter.
- Buy a copy of the ARRL Handbook and do a bit of reading in the first 50 pages or so to beef up your understanding of electronics



# A few supplies

- Have a few extra coax jumpers
- Get some double-SO239 female-female connectors so you can lengthen radio connections
- Get an SWR meter that works on your bands
- A soldering iron and some solder, and a few hand tools will help you learn a lot.

# A few antennas!

- Memorize the basic lengths of a few different bands' antennas:
  - 80 meters, about 135 feet for a dipole
  - 2 meters, about 39 inches for a quarter wave vertical
  - 20 meters 36 feet is close
  - 40 meters about 65 feet

Any other ideas?

