Radio Basics: How to Choose Your First Radio

So you want a Ham radio - for what?

April 2019 Communications Academy
Instructor: Carl Leon, N7KUW
Agenda

- Overview of Beginners Track
- Quick intros
- Stuff to consider
- New vs. used
- Research
- Mobile, handheld, & base station options
- Antenna (very) basics
- Retail & used sources
- A quick word about commercial (non-ham) radios/communications.
The Beginners Track

- **Getting your first radio** – Carl Leon, N7KUW
- I have my radio, how do I turn it on? – Joel Ware, KD7QKK, Bill Thomassen, N6NBN
- **Safety for Beginners** – Jon Newstrom, KL7GT
- But I’m afraid to talk into the microphone – Alan Jones, KD7KUS
- **This is fun, What’s Next?** – Don Marshall, KE7ARH
- I Get it Now! Where do I Go From Here? – Carl Leon, N7KUW
The Beginners Track

- Simplex Net for Beginners (here this weekend)
  - 144.330 MHz, tone of 103.5

- Hands On Radio Programming Help
  - How Do I Turn It On class
  - Conference Room in Olympic Hall
    - If nobody there, call on simplex net
    - VFO and PC Programming help
The Beginners Track

Other Clubs, Organizations, and Radio Nets:

Mike & Key Amateur Radio Club Special
Events & Information Guide – Puget Sound
and surrounding area.

A Listing of Radio Nets you can monitor or join in.
A Listing of Puget Sound area Repeaters (see also WWARA.ORG)
A Listing of periodic Amateur Radio Exam Sessions
A Listing of Public Service Events supported by Ham Radio
A Listing of Hamfests and Conferences
A Listing of Clubs and Club Contacts
A Listing of Emergency Preparedness Groups
For More Information

WWW.N7KUW.COM/CommAcad/
Copy of this presentation

Email me: Carl@n7kuw.com
Intros and “Why Amateur Radio?”

- Intros
  - Your name and call sign
  - How long involved with ham radio?
  - Reason for getting involved?

- In order to select your first (or next) radio, ask yourself why you became a ham in the first place....
- What do you plan to do with your radio?
- What do you know (and what do you need to know)?
- What was it that drew you to the hobby?
- What are your future goals?

- Two goals of this presentation:
  - Provide basic information about radios & how they’re used
  - Equip you with tools to make good decisions when getting your first (and second, and fiftieth? 😊) radio
Getting a Radio: Considerations

- What are you going to do with it?
  - Occasional or Frequent Operator?
  - Public Service Oriented?
  - Contesting?
  - Emcomm?
- Fixed, Mobile or Portable?
- Apartment, covenant-restricted, rural?
- VHF, UHF, HF, Satellite?
- Digital modes?
- New or Used?
- How much are you able or willing to invest? 😊
New vs. Used

<table>
<thead>
<tr>
<th>Benefits of Used</th>
<th>Problems with Used</th>
</tr>
</thead>
<tbody>
<tr>
<td>More bang for the buck</td>
<td>You might inherit problems</td>
</tr>
<tr>
<td>More ‘track record’</td>
<td>Not latest technology</td>
</tr>
<tr>
<td>Might get it from a friend</td>
<td>Might not be your friend for long! 😊</td>
</tr>
</tbody>
</table>

Usually no warranty
## New vs. Used

### New

<table>
<thead>
<tr>
<th>Benefits of New</th>
<th>Problems with New</th>
</tr>
</thead>
<tbody>
<tr>
<td>Latest technology</td>
<td>No track record</td>
</tr>
<tr>
<td>Usually has a warranty</td>
<td>Usually more expensive</td>
</tr>
<tr>
<td>Accessories available</td>
<td>Simple or aftermarket alternatives may not be available yet</td>
</tr>
<tr>
<td>Often smaller</td>
<td>Smaller isn’t always best</td>
</tr>
<tr>
<td>Feature set is often “better”</td>
<td>Improvements may be small increments</td>
</tr>
</tbody>
</table>
Research Before You Buy

- Save yourself a lot of grief
- Remember, opinions are like belly-buttons...
  - Look for personal experience
- QRZ.COM
- eHam.net
- CQ-amateur-radio.com
- ARRL.org
- Various Yahoo/Google Groups
- Retail sites such as universal-radio.com, hamradio.com, aesham.com, texastowers.com and others
- Local hams, clubs, ARES/RACES team, etc.
Mobile vs. Handheld vs. Base

- How will you operate?
- Can you afford several types?
- In General
  - HT’s have lowest power, but most utility
  - Mobiles can be used as a base station (need power supply)
  - Many base station rigs are also transportable
  - HT’s can be connected to an amp for more power (less common)
    - So can mobiles
    - So can bases
- Output Power: 50/20/10/5 W (144 MHz),
- 35/20/10/4 W (430 MHz)
Handie-Talkies ("HTs")

- Mono-banders usually least expensive
  - Note: Don’t unnecessarily limit yourself
- Most have a 5 Watt output on 2M
- Dual-banders are probably the most popular
  - Option: Dual receive (more expensive)
  - Single receive (can be competitive with mono-banders)
## Handheld Radios (HT)

<table>
<thead>
<tr>
<th>Model</th>
<th>Price</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baofeng BF-F8HP</td>
<td>$30-$35</td>
<td>eBay</td>
</tr>
<tr>
<td>Yaesu FT-60R</td>
<td>$155</td>
<td>HRO</td>
</tr>
<tr>
<td>Anytone D868UV</td>
<td>$160</td>
<td>HRO</td>
</tr>
<tr>
<td>TYT MD-380</td>
<td>$80-$100</td>
<td>eBay</td>
</tr>
<tr>
<td>Kenwood TH-D72A</td>
<td>$380</td>
<td>HRO</td>
</tr>
<tr>
<td>Icom ID-51A Plus</td>
<td>$329</td>
<td>HRO</td>
</tr>
<tr>
<td>Kenwood TH-D74A</td>
<td>$509</td>
<td>HRO</td>
</tr>
</tbody>
</table>
My Prejudices (Preferences)

Wouxun
KG-UV6X
136-174 / 375-512 MHz Commercial Dual Band VHF/UHF 200 Channel Portable Radio - 5W VHF / 4W UHF
HRO Discount Price
$159.95

WXUSB
USB Programming Cable for KG-U Wouxun and Kenwood Radios
$16.99

WXHCB
1700 mAh / 7.4 Volt High Capacity Lithium-Ion Battery Pack for KG-U Series Hand Held Radios
$28.99

WXSPK
Compact Speaker / Microphone for the KG-U Hand Held Radios
$16.95

WXBTE
Cigarette Lighter Battery Eliminator for KG-U Radios
$14.95

WXGAT-ST
144 / 430 MHz High Gain Dual-Band Standard SMA Antenna for Hand Held Radios
$19.95

HS-05
Coax Jumper Cable SMA to SO-239 UHF Female 18 Inches
$11.95

$311
(Prices are up)
LABEL YOUR EQUIPMENT

- Put your name and/or call sign on everything!
- Make your call part of the power on screen.
- Label accessories so you know what radio they go with.
- Label wall warts so you know what they go with.
- Maybe color code accessories to radios.

- DO IT!
Mobiles (think “your car”)

- More power than an HT (some are 100W!)
- Can be used mobile, base or transportable with the appropriate power source
- Can be cost-competitive with HTs
- Easier to read displays than HTs
- Usually more features and capabilities
- Normally UHF/VHF, some HF...
- Big 4: Kenwood, Icom, Yaesu (Vertex), Alinco
- New to the field: Chinese, inexpensive
Some FM Mobiles, Basic to Fancy

- Icom’s IC 2300H 2 meter
- $170 range
Kenwood TM-281A, $135
True Dual-band operations

- Icom’s IC-2730A – About $276
Kenwood TM-V71A 2m/70cm with built in Echolink interface, $347.
High-end Kenwood with Built-in TNC, APRS $530  TM-D710G w/GPS
Icom ID-5100A D-Star - $370
Yaesu FTM-400XDR System
Fusion digital and APRS- $410
Quad-Band Operations (two at a time) for $323

- FT-8900R 29, 50, 144, 440 FM operations
A Note About Digital...

There are multiple digital technologies and protocols in use in amateur radio. Some are brand specific – proprietary in effect (they do not work with each other). D-Star, Fusion, DMR, P25.

If you are involved with a group of people who are using digital, then you may want to invest in whatever brand/protocol they are using. None are better than or worse than the others, they are just different from each other.

Or not. No need to rush in unless you really want to.
Digital versus “Digital”

- Digital: D-Star, System Fusion, DMR, P25
  Use a Vocoder to convert analog voice to digital and transmits a digital signal. Uses a vocoder to decode digital signal and give an analog sound from speaker. Need a specific digital radio per the system used.

- “Digital”: Fldigi, Winlink, Winmore, Pactor, etc.
  Encode a pseudo-digital signal on an analog radio transmission (FM, SSB). Use a regular UHF, VHF or HF radio.
Icom’s Mobile “Everything” Rig

- The IC-7100 has DSP and a host of cutting edge features and D-Star. In the $860 range
Kenwood HF “Base”

- Kenwood’s TS-590SG does satellite well, PLUS has a built-in antenna tuner and other cool stuff. In the $1300 range.
Yaesu’s FT-818 is Portable

- The very popular FT-818 series has 5W (“QRP”) output, is easily transported. Internal battery, many accessories... ~$650
Yaesu Mobile FT-857D HF

- FT-857 has ability to install a tuner, power supply or batteries inside the radio,
- Big, but more powerful than the 818 series. A good compromise radio for home and portable operations....and around $800 new
Entry HF

- Icom’s IC-718. Audio DSP. HF, about $625
Kenwood’s Entry HF

- At around $850, but includes 6 Meter operations, a remote face plate and built in auto-tuner!
- TS-480 SAT
Don’t Forget Yaesu!

- The FT-450D has a built-in auto-tuner, DSP and a very compact size. Sells for about $710 (HF + 6M)
High End HF: FLEX-6700 SDR

Starting at $6,000
Very High End HF Base
Icom IC-7851 - $12,500
Other Things to Consider for HF

- HF Rigs also require some of the following:
  - A power supply
  - An antenna tuner (if not built in)
  - A very LARGE antenna (as compared to what’s needed for UHF/VHF)
- Depending on your intentions...
  - Automatic keyer or straight key
  - Sound card interface
  - Computer
  - Coax (maybe a lot)
  - Etc.
Antennas are grouped in four basic categories:

- Beams: Typically most expensive (towers, etc.)
- Verticals: Less money than beams on average
- Wire: Usually the least expensive
- Dish: For Microwave frequencies
Verticals

- Include ground planes
- Mobile antennas
- Common for VHF and UHF base stations
- Can be ground-mounted for HF work
- Can be phased to give some directionality
- Vary from inexpensive to very expensive
- Consider whether a vertical is right for you
- **HTs:** Rubber Duck = “Dummy Load”
  - Get another one or two, depending on your use
- **Mobiles:** Buy a good antenna
  - Magnetic mounts okay, often not as good as permanent mounts
  - Center of metal mass tends to be best
  - Aesthetics may dictate placement! 😊
- Cushcraft R-8 Vertical
- Multi-Band HF
- Costs around $530
Or Maybe You Start With Something Simpler...

- 2M/440 “base station” antenna – Comet GP-3, ~$90
- Some stuff you’ll want to consider:
  - Gain:
    - 146MHz 4.5dBi
    - 446MHz 7.2dBi
  - VSWR: 1.5:1 or less
  - Max Power: 200 watts
  - Length: 5' 11"
  - Weight: 2 lbs. 12 oz.
  - Mounting Mast Dia: 1 1/2-2 1/4"
  - Connector: SO-239
  - Construction: Heavy-duty fiberglass
Beams

- Best directionality
- Satellite work
- HF beams are large, typically require a tower and a rotator
- The complete install can be very expensive and a lot of work
How much room and money do you have? 😊
Wire Antennas

▪ Most commonly used on HF
  ▪ Require at least two support points
  ▪ Work better higher off the ground, depending...
  ▪ Can be somewhat directional but not as much as a beam
  ▪ Fun to experiment with and a cost effective way to enjoy HF operation without a lot of investment
  ▪ Don’t forget NVIS! Regional HF communications...
Great... So Where do I Buy?

- Back to original questions...
- New?
- Used?
- Budget?
- Aside from traditional retail
  - Ebay
  - Flea markets
  - Other hams, word of mouth
  - Join a club!
Common Retailers

- Ham Radio Outlet – [www.hamradio.com](http://www.hamradio.com)
  - Closest store is in Portland
- AES – [www.aesham.com](http://www.aesham.com)
  - Nearest store is in Las Vegas
  - Good for new equipment information
- Texas Towers – [www.texastowers.com](http://www.texastowers.com)
- Ebay – many dealers sell here [www.ebay.com](http://www.ebay.com)
Used Sources

- Most new dealers have some used/demo
- [www.eham.net](http://www.eham.net) - extensive ham equipment
- [www.qrz.com](http://www.qrz.com) - almost as much as eham
- [www.ebay.com](http://www.ebay.com) new and used – research first!
- [www.arrl.org](http://www.arrl.org) - has limited classified listings
- When buying used or at auction, do your research before bidding. Know what an item is worth and consider ramifications.
Commercial Radios

Required for ANY non-amateur radio transmitting. You may NOT (legally) transmit on non-amateur frequencies with an amateur radio for any reason.

If it has a VFO it isn’t legal outside of the ham bands! (Baofeng, Wouxon, etc.)

Must have permission of system operator (license holder) to add a radio to a non-amateur system.
- Specific radios?
- Who else to ask?
- Other info sources?
- Intimidated?
For More Information

WWW.N7KUW.COM/CommAcad/
Copy of this presentation

Email me: Carl@n7kuw.com
Thanks for your Time....

And welcome to amateur radio!

Enjoy your time here 😊