



# HAM RADIO 101

A BRIEF INTRODUCTION TO AMATEUR RADIO

# HAM RADIO

## HANDOUT 1 “WHY HAM RADIO”

- It's Fun
- Exercises the brain
- Enhances knowledge of world geography
- Adds dimensions to interpersonal contacts
- Is an effective means of emergency communications
- An easy hobby to enter
  
- Note: Since ham radios are 12 volt - perfect fit for Airstreams

- Jim Cocke N5RTG

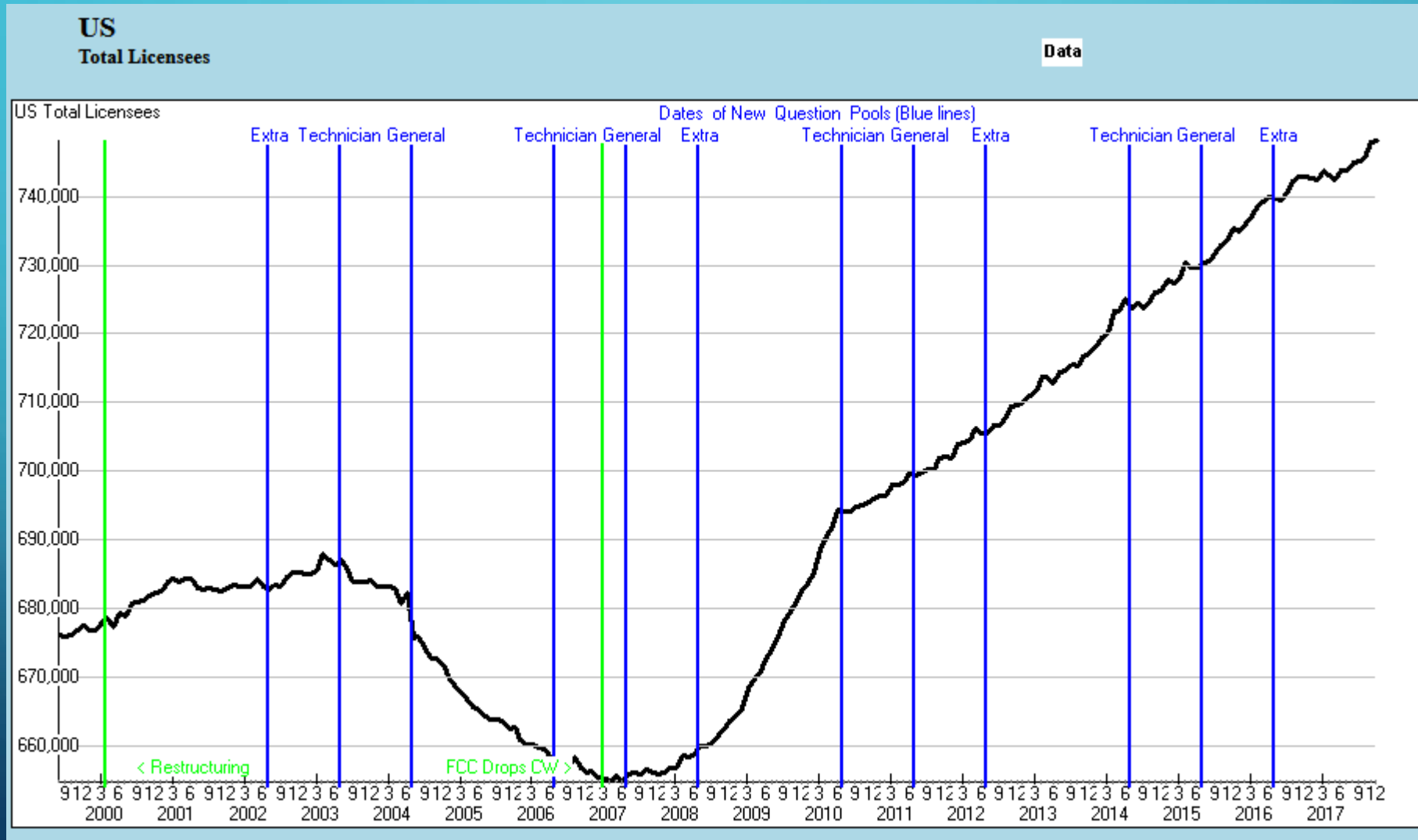
# “I THOUGHT HAM RADIO DIED 50 YEARS AGO.”

## Total Amateur Radio Station Licenses (by month by class)

Month	Extra	Advanced	General	Technician	Novice	ARS Total
Jan-19	147,560	39,487	176,089	384,509	8,307	755,952
Dec-18	147,369	39,607	175,949	384,145	8,360	755,430
Nov-18	147,131	39,718	175,750	383,674	8,410	754,681
Oct-18	146,892	39,828	175,550	383,202	8,459	753,931
Sep-18	146,777	40,001	175,396	382,886	8,489	753,549
Aug-18	146,567	40,155	175,210	382,580	8,544	753,054
Jul-18	146,356	40,308	175,024	382,273	8,598	752,559
Jun-18	146,254	40,513	174,990	382,138	8,653	752,548
May-18	146,151	40,716	174,900	381,669	8,706	752,142
Apr-18	145,728	40,905	174,464	380,234	8,766	750,097
Mar-18	145,498	41,153	174,478	379,735	8,847	749,711
Feb-18	145,406	41,470	174,416	379,400	8,949	749,641
Jan-18	145,012	41,621	173,922	377,807	8,987	747,349
Dec-17	145,034	41,938	174,206	377,902	9,056	748,136
Nov-17	144,985	42,208	174,162	377,507	9,132	747,994
Oct-17	144,666	42,479	173,694	375,597	9,192	745,628
Sep-17	144,672	42,838	173,601	374,833	9,257	745,201
Aug-17	144,654	43,070	173,471	374,378	9,309	744,882
Jul-17	144,387	43,240	173,170	373,653	9,373	743,823
Jun-17	144,349	43,425	173,129	373,558	9,433	743,894
May-17	144,092	43,643	172,938	373,364	9,496	743,523
Apr-17	143,835	43,842	172,747	373,169	9,558	743,151
Mar-17	143,739	44,117	172,793	373,487	9,670	743,806
Feb-17	143,379	44,392	172,558	372,436	9,753	742,518
Jan-17	143,358	44,732	172,682	371,998	9,882	742,652
Dec-16	143,337	45,071	172,807	371,560	10,012	742,787
Nov-16	143,411	45,317	172,783	371,390	10,102	743,003

Historically largest number of US Amateur licensees

# U.S. LICENSES SINCE 2000





# AMATEUR RADIO BANDS

## HANDOUT 2

### US Amateur Radio Bands

#### US AMATEUR POWER LIMITS

At all times, transmitter power should be kept down to that necessary to carry out the desired communications. Power is listed in watts PEP output. Except where noted, the maximum power output is 200 Watts.

Effective Date  
February 23, 2007

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

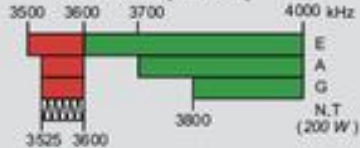


#### 160 Meters (1.8 MHz)

Avoid interference to radiolocation operations from 1900 to 2000 kHz



#### 80 Meters (3.5 MHz)



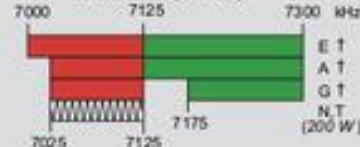
#### 60 Meters (5.3 MHz)

USB only  
2.8 kHz



General, Advanced, and Amateur Extra licenses may use the following five channels on a secondary basis with a maximum effective radiated power of 50 W PEP relative to a half-wave dipole. Only upper sideband suppressed carrier voice transmissions may be used. The frequencies are 5330.5, 5366.5, 5368.5, 5371.5 and 5403.5 kHz. The occupied bandwidth is limited to 2.8 kHz centered on 5332, 5348, 5368, 5373, and 5405 kHz respectively.

#### 40 Meters (7 MHz)



† Phone and image modes are permitted between 7075 and 7100 kHz 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(b)(1). Novice and Technician licenses outside ITU Region 2 may use CW only between 7075 and 7075 kHz. See Section 97.301(v). These exemptions do not apply to stations in the continental US.

#### 30 Meters (10.1 MHz)

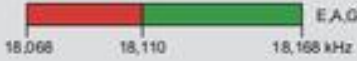
Avoid interference to fixed services outside the US.



#### 20 Meters (14 MHz)



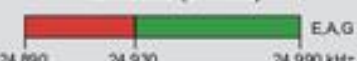
#### 17 Meters (18 MHz)



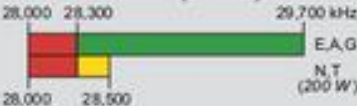
#### 15 Meters (21 MHz)



#### 12 Meters (24 MHz)



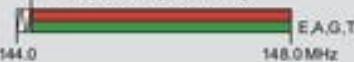
#### 10 Meters (28 MHz)



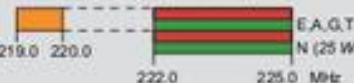
#### 50.1 6 Meters (50 MHz)



#### 144.1 2 Meters (144 MHz)

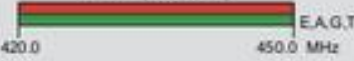


#### 1.25 Meters (222 MHz)



\* Geographical and power restrictions may apply to all bands above 430 MHz. See The ARRL Operating Manual for information about your area.

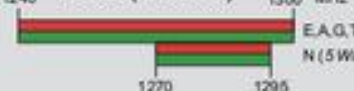
#### 70 cm (420 MHz)\*



#### 33 cm (902 MHz)\*



#### 23 cm (1240 MHz)\*



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

2300-2310 MHz	10.0-10.5 GHz	122.25-123.0 GHz
2390-2490 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

#### KEY

Note:  
CW operation is permitted throughout all amateur bands except 60 meters.

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

Test transmissions are authorized above 5.1 MHz, except for 219-220 MHz.

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

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

See ARRLWeb at [www.arrl.org](http://www.arrl.org) for more detailed band plans.

**ARRL**  
We're At Your Service

ARRL Headquarters:  
960-694-0200 (Fax: 960-694-0295)  
email: [hq@arrl.org](mailto:hq@arrl.org)

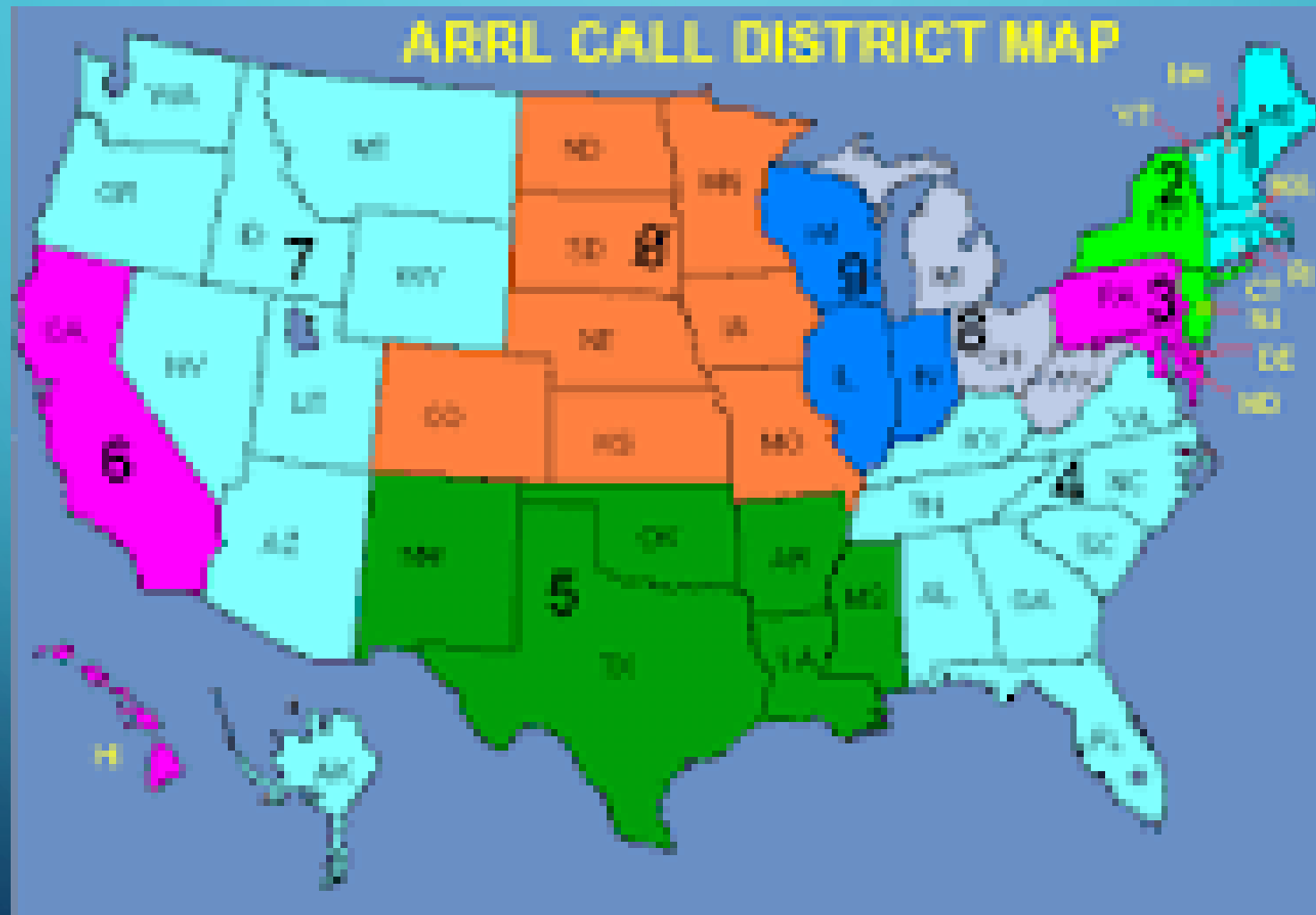
Publication Office:  
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email: [membership@arrl.org](mailto:membership@arrl.org)

Getting Started in Amateur Radio:  
Toll-Free 1-800-338-3942 (960-694-0305)  
email: [news@arrl.org](mailto:news@arrl.org)

# ARRL WAS MAP

HANDOUT 3



# WHAT ABOUT CITIZENS BAND (CB) RADIO??

## CB RADIO

- 50 years old, since 70's & C.W. McCall's "Convoy"
- No license requirement
- 40 channels limited to one Band
- 12-watt legal limit
- Unregulated, unpoliced
- Limited Range

## HAM RADIO

- >100 years old
- Requires a license to transmit
- >20 unlimited Bands, no channels
- 1500 watt legal limit
- Self-policing, FCC regulated
- Around the globe on HF bands

# FACETS OF THE HOBBY

- Voice (Single Side Band – SSB), Range – around the world
- Digital (Many different modes – FT8, FT4, JT65, PSK31, etc.)
- CW (Morse Code)
- Earth-Moon-Earth (EME), Meteor Scatter
- Emergency Communications – When cell towers fail
- Contesting
- Award achievements
- DIY Projects
- QRP (5 watts) vs 1500 watts
- Chasing DX



# LICENSE CLASS & TESTING

- Entry into Amateur Radio      TECHNICIAN      35 Question Test
- 2<sup>nd</sup> Level      GENERAL      35 Question Test
- Top Level      EXTRA      50 Question Test
- Licenses no longer available – Novice, Advanced
- Morse code (CW) no longer a requirement

# LICENSES, BANDS AND EQUIPMENT

- Technician
  - Voice privileges on 10M (28.3-28.5 Mhz), but rarely used band
  - Most common - Very High Frequency (VHF) and Ultra High Frequency (UHF)
    - Bands - 144 -148 MHz (aka 2 M), 420-450 MHz (aka 70 cm)
    - Handheld (Handie talkie aka HT)
- General and Extra - High Frequency (HF)
  - Talk around the world
  - Popular brand names – Kenwood, Icom, Yaesu

# BEST WAYS TO STUDY

- Study resources
  - Exam.tools which uses HamStudy.org
  - Ham-Cram.com (requires testing at ARRL test location)
  - HamTestOnline.com
  - HamExam.org
  - ARRL.org/exam-practice
- You are REQUIRED to register in the FCC CORES system and receive a Federal Registration Number (FRN) before exam day. For FRN registration information, see <https://apps.fcc.gov/cores/userLogin.do>
- Note: COVID-19 has moved most exams online! See [www.arrl.org/FindOnlineExam](http://www.arrl.org/FindOnlineExam)

# CALL SIGNS

- In the US: 1x1 Call = W4Y, 2x2 Call = AD4ET, 1x2, 1x3, 2x3
- Current Call Sign assignments are 2x3 and are in KO4xxx range. (3/19/2020)

## VANITY:

- Not allowed as first Call Sign
- Free / no fee
- Can choose Call Signs that are available for your license class
- Often initials, nickname, easy to say or remember

# TYPICAL CONVERSATION (QSO)

## HANDOUT 4 – HAM RADIO 101: LEARNING THE LINGO

- KD8ZIG has a vanity call sign, his nickname is Ziggy
- Bernie may too if his name is Bernard Robert Nelson (BRN)
- Other ham jargon
  - QSY – I'm changing frequencies to XX
  - QSL – I heard what you said, affirmative, also QSL cards
  - QRM – interference, QRMary
  - QRN – static, QRNancy
  - QRZ – who is calling me?
  - QST – message to all amateurs, also ARRL Magazine
  - QRP – 5 watts or less



# CAROLINAS AIRSTREAM CLUB HAMS - WB4CAC

- Our Airstream club has 29 hams at various levels of activity and license levels
- WBCCI has a Amateur Radio Intra-club - WB8RC
- The purposes of the Intra club are:
  - Service to the public
  - Furtherance of public welfare by relaying messages via ham radio in time of need and emergency
  - Promotion of education and interest in the sciences of amateur radio
  - Promotion of fellowship and goodwill among all radio amateurs.

# WEB RESOURCES

- [QRZ.COM](http://QRZ.COM) – look up call sign details
- [ARRL.COM](http://ARRL.COM) – look up info on ARRL
- [Repeaterbook.com](http://Repeaterbook.com) - find 2M and 440 repeaters nearby
- Popular vendors
  - [hamradio.com](http://hamradio.com)
  - [dxengineering.com](http://dxengineering.com)
  - [mfjenterprises.com](http://mfjenterprises.com)
- Research, reviews, classifieds
  - [eHam.net](http://eHam.net)

# QUESTIONS?

- Email Bruce [AD4ET@arrl.net](mailto:AD4ET@arrl.net) or Marcia [NC4MT@arrl.net](mailto:NC4MT@arrl.net)