

Amateur Radio and SDR

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Introduction - Background

- Software developer
 - 17+ years professionally
 - 30+ otherwise
 - Security software
 - Design and implement secure APIs
- IT Background
 - Boeing Aerospace Operations
 - ISP (dial-up land)
 - Consulting
- Software Development
 - PentaSafe Technologies
 - NetIQ
 - TheAnimenetwork.com
 - BRS Labs
- CISSP 2005+
- BSD user
- Amateur radio enthusiast

What is Amateur Radio?

- Radio service operated by amateurs, *i.e.* non-professional
 - Not for monetary gain
 - Typically a real person
 - Clubs can organize for amateurs to work together
- Amateur Radio Service
- Established by the International Telecommunications Union
- Regulated by international agreement
 - Regulations implemented through harmonizing of laws by national governments
- Three regions:
 - Region 1 (Europe, Middle East, CIS, Africa)
 - Region 2 (Americas)
 - Region 3 (South and East Asia, Pacific Ocean)

When Did Amateur Radio Start?

- Officially, early 1900s
- However, amateurs have operated since the beginning

Why "Ham"?

- Believed to have begun as pejorative because amateurs were "ham fisted" on their key (Morse Code)
- Adopted by amateurs as badge of honor

Notable Accomplishments by Amateur Radio

- One of the oldest radio associations in the world, American Radio Relay League (ARRL)
 - Begun in 1914 by Hiram Percy Maxim
- Numerous satellite launches
- Led development of packet radio
- Long-distance transmitting around the world using various
 - Skip propagation
 - Moonbounce (Earth-Moon-Earth EME)
 - Meteor scatter
- Development of Slow-Scan and Fast-Scan Television
 - Shortwave radio equipment to send television images using normal voice bandwidth

A Few Radio Notes

- Mhz vs wavelength

Privileges – What Can a Ham Do?

- Transmit in numerous bands
 - Depends on license class
- Transmit using various modes of communication
 - Voice
 - Image
 - Text and Data
 - Continuous Wave (CW) – Morse Code
 - Packet Radio
 - Phase-Shift Keying
 - Spread Spectrum
 - Digital
- Operate stations in other countries
 - If reciprocal licensing in place
 - Limited by country laws, not US

- 3 License classes in US:
 - Technician
 - General
 - Amateur Extra
- Technician
 - 35-multiple-guess-question exam
 - No Morse code required
 - Voice privileges
 - Various modes allowed
 - Limited in high-frequency bands
- General
 - 35-multiple-guess-question exam
 - All privileges of Technician
 - Access to 83% of all amateur HF bands
- Amateur Extra
 - 50-multiple-guess-question exam
 - All privileges allowed to amateurs
- License good for 10 years

- Renewal fee, no additional testing

Hardware – What Do I Need?

- Technically, nothing... but that's no fun
- A receiver, better than nothing, but still no fun
- A transceiver... ahh
 - A handy talkie like the BaoFeng
 - A mobile rig – not (!!!!) a CB
 - A portable rig
 - A beast
- Handy Talkies
 - Battery powered
 - Typically 1 to 3 bands (70 cm, 2 m, 6 m)
 - 1 to 5 watts
 - 100 or so memories
 - DTMF keypad

Hardware Other

- Antenna
- Antenna tuner
- Computer
- Sky's the limit

- Software-Defined Radio
- Replaces purpose-specific circuits with general purpose computing and software algorithms

Getting Started

- Shoot for Technician class license first
 - Learn some basic electronics
 - Learn how to use Ohm's Law
 - Memorize some band-plan information
- Get a study guide
 - ARRL books very good helpful
 - Numerous online resources
 - <http://hamexam.org>

Once You Pass

- Get an inexpensive radio
 - No easier way to lose interest than to not have a radio
 - BaoFeng handy talkies are cheap (~\$35.00 on Amazon)
- Look for a club
- Join ARRL
 - QST Magazine has tons of info and articles

- Get an RTL SDR
 - About \$20.00
- Get a HackRF, BladeRF or AirSpy
- Get the software
 - rtl-sdr
 - gqrx
 - GNU Radio

Questions

- Questions - You have them, I may have answers

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Ham Radio Clubs and License Info

- FCC
- ARRL
- ARRL Club Finder
- Gordon West
- HamExam
- QST

Radio Gear

- BaoFeng
- Houston Amateur Radio Supply
- Icom
- Kenwood
- Motorola
- Yaesu

SDR People and Resources

- rtl-sdr
- Great Scott Gadgets
 - Michael Ossmann
 - HackRF
 - YardStick
- BladeRF
- AirSpy

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