

Censorship-Resistant Sites with Radio!

HOPE 2026

...

Dan Tennery-Spalding K6XCX

Introduction

- This is an introduction to BBS'es, and how to run one over Ham radio.
- No experience is expected or required!

About Me

I have a 10 years' experience in cyber-security, preceded by 10 years' experience in adult education.

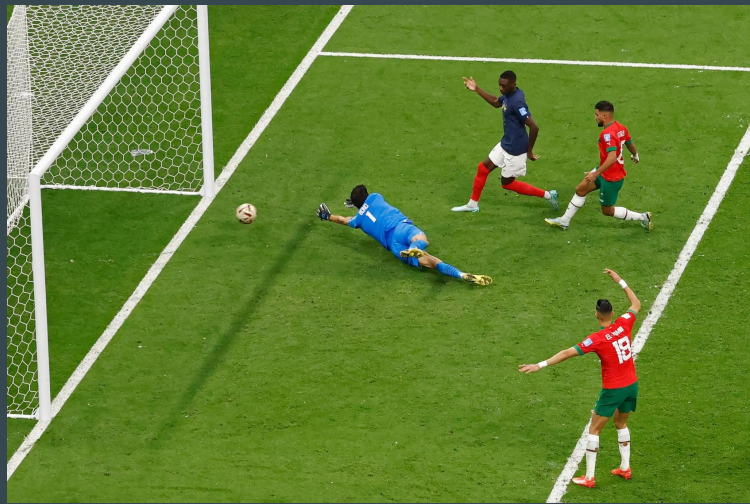
- That's why I believe that most people learn best in community.
- That's also why I co-founded the Lefty Radio League, at <https://leftyrad.io>



Goals

My goal is for you to leave this thinking, “I could do that.”

- Packet radio BBS is not *hard* – but it is complicated.



Disclaimers

- Anything in this talk that mentions illegal activity is for informational purposes only.
- I've necessarily simplified some information here.
 - There are exceptions to everything radio and/or digital.
 - But it will be precise enough to get you started!

Intro to BBS

- I got into BBS'es in the 1990s.
- If you're not familiar, imagine a primitive website that only one person can log into at a time – over the phone.
- You could email other users, post on message boards, upload and download files, etc.
 - Functionality was similar to modern websites today.
- Some sample screenshots are below:

CHICAGO

SysOp : Shabbir Damani
Speed : 3/12/24/96 HST MNP
Time : 24 Hours a Day
Phone : 312-728-9722/728-4152

WELCOME TO THE WORLD OF

3 lines supporting upto 9600 BPS
INFO-MAT Magazine
Member of INTERLINK
260MB on line for downloads
Conf SysOp, Language, Network, Database &
Runing on NOVEL NETWARE 2.1 Qmodem.



DOSBox 0.74-3, Cpu speed: 3000 cycles, Frameskip 0, Program: RENEGADE



S O U L
C A G E

,sS"\$\$\$"Ss, ,sS"Ss, ,sS ,sS"Ss, /|skii by Lord
\$\$\$ \$\$\$ \$\$\$ \$\$\$ \$\$\$ \$\$\$ \$\$\$ \$\$\$
\$\$\$ \$\$\$ \$\$\$ \$\$\$ \$\$\$ \$\$\$ \$\$\$ \$\$\$ /- /PHILY\ -\
\$i\$ \$\$\$ \$i\$ \$\$\$"\$\$\$ \$\$\$ \$\$\$ \$\$\$
\$ \$ \$\$\$ \$ \$ \$i\$ \$i\$ \$\$\$ \$\$\$ \$\$\$
\$\$\$ \$\$\$ \$\$\$ \$\$\$ \$\$\$ \$\$\$ \$\$\$ \$\$\$

Imessage System	lf(-Warez Menu	oinline Gamez	elmail System
ib/bbs Listingz	lvoting Booths	ulser Listing	ylfour Info
Intote to Lord	llist of Callers	linfo on s.C.	lpersonal Info
lglet off Fast	lchat w/ Lord	lglet off Fast	lauto-message
	lttime left		

File Base - [0-30] Windows

Mag base - [Soul Cage] Warez Requests

Main menu[45:59:59 left

Command :

Lord

Barney #1

AR: ABCDEFGHIJKLMNOPQRSTUVWXYZ

AC: LCUA*PEKM1234 Baud: 0

NSL: 255 Time: 32759

DSL: 255 Node: 1

Why BBS Today?

BBS'es fulfill the web's promise of meeting and communicating with other, like-minded human beings.

- It does so without any corporate intermediaries:
 - No ISPs, tech companies... you don't even need running power!
- They also have unbeatable vibes.
 - Really fun low-fi ASCII graphics (sadly only black and white)



BBS Features

Email	1 → 1 communication
Message Boards	1 → 1000+ communication
Uploads / Downloads	Exchanging files
Federation	→ Networks
Games	Games

Packet Radio BBS Infrastructure

It used to be phone lines.

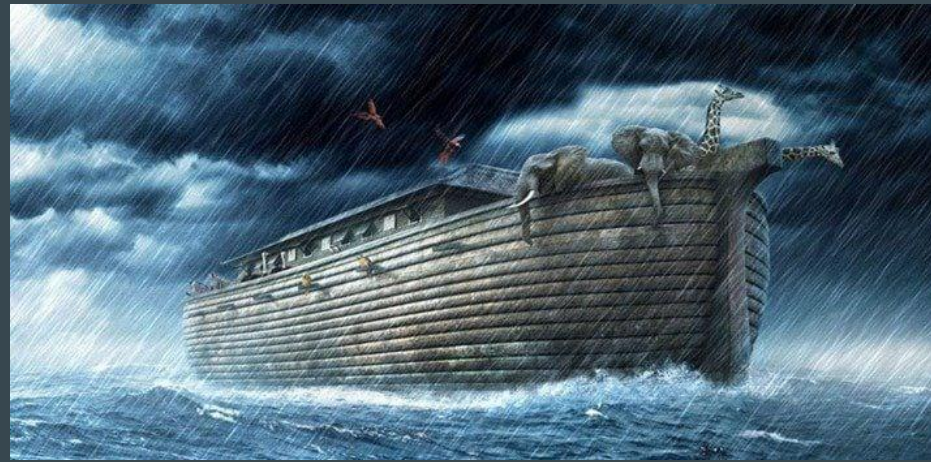
- Now it can be anything radio:

<u>Name</u>	<u>Power</u>	<u>Range</u>
LoRa	1 Watt	A hundred feet to a mile
Ham: VHF/UHF	5+ Watts	1-5+ miles
Ham: HF	1-200+ Watts	100-500,000* miles *moon bounce

The ApocalyBBS

BBSes work when infra and other options are unavailable.

- Tech companies, data centers, utilities can be down.
- Or if physical spaces like parks are off limits due to chemical spills, disease, or are shut down for curfew etc.



So Can Others – BUT:

- **Satellite Comms:** Expensive and subscription-based
- **Starlink:** Same as above, needs line of sight to satellite
- **Mesh networks:** Unreliable, God bless
- **Winlink:** Needs portal to internet, not for horizontal comms
- **AREDN:** Super cool but need specific hardware, will be limited
- **(Voice) Ham radio:** This is easily the coolest but is not good for precision comms (try spelling “azithromycin” over the radio), leaving messages for future users, etc.

Yes-And, not Either-Or

Packet radio BBS is free of many of the above limitations.

- No expensive equipment
- No monthly subscription
- Don't need line of sight to a satellite
- Long range (several miles or more) and no mesh required
- Allows more precision (via typing) than voice comms

Disadvantages: The Four S's

- Speed: 1200 baud (bits per second) is standard
- Setup / Settings: Can be finicky to setup successfully
- Security: There is none by default; like, at all
- S'License: You need one for Ham radio

Setup! (Explanations in next slide)

In the abstract:

Client → Radio → Radio → BBS

For me:

Macbook –(*Telnet*)→ Pi (*Direwolf + Paracon BBS client*)→ Digirig → Ham
Radio → Ham Radio → Masters Communications DRA Pi Hat → Pi
(*Direwolf and BBS software*)

Explanation of Hardware and Software

Software

- Direwolf translates audio into digital signals and vice versa.
 - You need one for the client and server/BBS, natch.
- Paracon is the client to login to the BBS.

Hardware

- Digirig lets your computer “press” the push-to-talk button on your radio and transmit.
- I ran the client off a Pi because Direwolf doesn't run on OSX, I don't have a Linux machine, and I do have a Windows laptop but it sucks.

Promo Text Here

Special thanks to Seth and Joel from N2YCR!

- Check out [NYC Resistor](#) – the coolest maker space on the east coast!!



NYCRESISTOR

Ham Licenses

T5A07

18. Why are metals generally good conductors of electricity?

- ☐ A. They have relatively high density
- ☐ B. All these choices are correct
- ☐ C. They have many free electrons
- ☐ D. They have many free protons

The first Ham license is called “Technician”.

- The “tech” exam has 35 multiple-choice questions out of a pool of 412.
- Pass with 74% (26 questions) right.
- You pay ~\$10 to take it online, \$35 for your license if you pass.
 - You get a 10-year license and a random call sign.

More Licensing Considerations

You have to give the FCC your legal name.

- Call sign is public searchable and ID's you.
- Your address is visible online via your callsign.
 - Use a PO Box or community center, etc., instead of your home address!
- Do you have a felony conviction?
 - You have to include a written explanation...
 - But you'll probably still get a license.

The screenshot shows the FCC's Universal Licensing System (ULS) interface. At the top, the FCC logo and 'Federal Communications Commission' are visible. The page title is 'Universal Licensing System'. Below the navigation bar, the breadcrumb trail reads 'FCC > WTB > ULS > Online Systems > License Search'. The main heading is 'License Search'. A descriptive paragraph states: 'The ULS License Search enables you to search for a wide range of licenses in the Universal Licensing System. The License Search here provides specify more attributes combinations with the [Advanced Search](#) and search within services like [Amateur](#) using service-specific criteria. Please be a longer wait.'

There are two main search sections:

- License Search:** Features a dropdown menu for 'By Call Sign', an equals sign, a text input field, and a 'SEARCH' button. Below this is a checkbox for 'exact matches only' and a link for 'Advanced License Search'.
- Advanced Search:** Includes a sub-heading 'Advanced Search' and a description: 'Want to search for licenses of any radio service code based on combinations of general license attributes?'. It features a blue arrow icon and a link 'Advanced License Search'. Below this, it lists search criteria: 'Advanced License Search includes: License State, ZIP, and Name; Dates (Grant, Last Action, etc); License Status; Radio Service Code; And more.'
- Service Specific Search:** Includes a sub-heading 'Service Specific Search' and a description: 'Want to search for licenses within a service using criteria relevant to that specific service?'. It lists several service categories with blue arrow icons and links: 'Aircraft', 'Amateur' (with subtext 'Vanity Call Signs, Operator Class, and more.'), 'Commercial/Restricted Permits' (with subtext 'Operator Class, COLEH, and more.'), 'GMRS', and 'Ship' (with subtext 'MMSI#, Ship Name, and more.').

Why Get Licensed?

Basic reasons:

- It's the law.
- It's cheap.
- It's fast and easy.

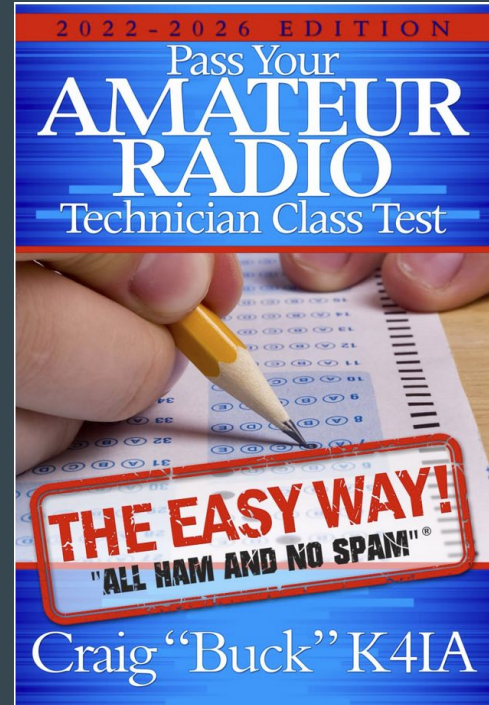
Important reasons:

1. It's honestly more important to have a license for conventional voice and repeater use over Ham radio.
2. Make your own decisions. It's your life.



How to Study for Your Ham License

- www.hamstudy.org
- [HamStudy phone app](#)
- *Pass Your Amateur Radio Technician Class Test - The Easy Way*
 - From the “All Ham and No Spam” series



Ham Radio DNA

Ham radio was founded on transparency.

- Anyone can listen to any Ham at any time.
- Anyone can legally (and practically) listen to any radio frequency.



What You Can't Do With Ham

Ham's DNA explains some of its legal limitations:

- Illegal to encrypt transmissions or talk in code.
 - There *are* security-by-obscurity options: Low transmit power, less-used bands...
- Illegal to broadcast music – no pirate radio :(

There are also technical limitations:

- With some work, someone can find your location when transmitting. (like all radio)
- If you talk to someone, everyone else on that frequency can hear you. (unlike a cell phone)



Further Resources

- [The Modern Ham](#)
- [Digipi](#)
- [NYC Resistor](#)
- [Lefty Radio League](#)