

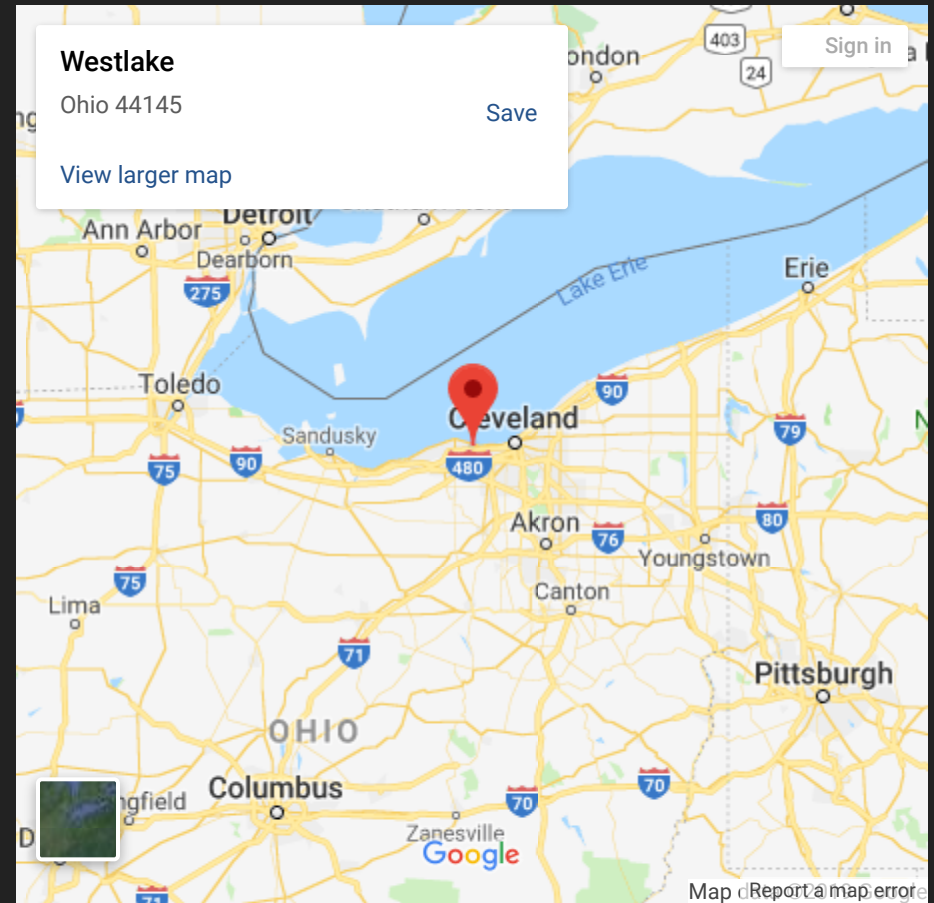
**JEFFREY KOPCAK**

**K8JTK**

**ARRL OHIO SECTION TECHNICAL COODINATOR**

# BIOGRAPHY

- Born, raised, and live in Westlake, Ohio
- Interested in amateur radio at a young age through my father, Tom N8ETP
- Licensed right before my sophomore year of high school in 1999
- Novice, Technician, General, Extra exams



# BIOGRAPHY

- Westlake High School
  - WHBS-TV
- Bowling Green State University (BGSU)
  - WBGU-TV
- Cleveland State University (CSU)
  - Information Systems & Technology
  - Masters of Business Administration



# HAM RADIO BIOGRAPHY

- Computers and digital modes
  - Computer radio programming
  - Early VoIP, aka EchoLink
  - D-STAR, Fusion, DMR
  - HF station: JT65, PSK, Olivia, SSB. Now: FT8, Winlink.
  - SDR
  - All VoIP: AllStar Link, Hamshack Hotline, ...
- Operating: anywhere. 20m, 40, 80 evenings. 2m, 440 locally.
- Radios covering 160m - 1.2 GHz, except 900

More: [On Air](#)



# CLUBBING

- Life Member of the [Wood County Amateur Radio Club \(WCARC\)](#) - Webmaster
- Life Member of [American Radio Relay League \(ARRL\)](#)
  - [Volunteer Examiner \(VE\)](#)
  - [Technical Specialist \(TS\)](#)
  - [Maxim Society](#)
- [Dayton Amateur Radio Association \(DARA\)](#)
- [TAPR](#)
- [West Chester Amateur Radio Association](#)
- [Skywarn](#) spotter/NCS
- Net control for the [Ham Nation D-STAR After Show Net](#)

More: [Clubs and activities](#)

# AND NOW...



ARRL Ohio Section: Technical Coordinator.

# ARRL FIELD ORGANIZATION

The ARRL divides the United States and its territories into 71 administrative [sections](#). Many sections are comprised of a single state, but a few of the larger states, such as Texas or California, are divided into two more sections.

The membership in each section elects a [Section Manager](#) (SM) once every two years. The SM is responsible for managing the Field Organization programs in their section. Through coordinators, the SM recruits ARRL volunteers to staff various crucial program areas.

# ARRL: STRUCTURE

- ARRL Officers
  - President, First & Second Vice President, COO, ...
- ARRL Board Committees
  - Executive Committee, Administration & Finance, Programs & Services, Public Relations, DX, LoTW ...
- Divisions
  - 15 Divisions
  - Director & Vice Director



# ARRL: STRUCTURE - SECTIONS

- Section Manager (SM)
- Section Traffic Manager (STM)
- Section Emergency Coordinator (SEC)
- Assistant Section Manager (ASM)
- Official Observer Coordinator (OOC)
- Technical Coordinator (TC)
- Affiliated Club Coordinator (ACC)
- Public Information Coordinator (PIC)
- State Government Liaison (SGL)
- Section Youth Coordinator (SYC)

<http://www.arrl.org/field-organization>

# TECHNICAL COORDINATOR

The ARRL Technical Coordinator (TC) is a section-level official appointed by the Section Manager to coordinate all technical activities within the section.

- Supervise and coordinate the work of the section's Technical Specialists (TS)
- Refer amateurs in the section who need technical advice to local TS
- Encourage amateurs in the section to share their technical achievements with others through the pages of QST, at club meetings, hamfests, and conventions

# TECHNICAL COORDINATOR

- Be available to assist local technical program committees in arranging suitable programs for local club meetings, ARRL hamfests, and conventions
- Promote technical advances and experimentation at VHF/UHF and with specialized modes, and work closely with enthusiasts in these fields within the section

<http://www.arrl.org/technical-coordinator>

# TECHNICAL SPECIALIST

For a section team to be effective in one of the most important arenas in Amateur Radio, technology, there must be a cadre of qualified, competent Technical Specialists (TS).

"Advancement of the radio art" is a profound obligation we incur under the rules of the FCC.

TSes help meet this obligation.



# TECHNICAL SPECIALIST

TS supports the TC in two main areas of responsibility:  
**Radio Frequency Interference and Technical Information.**

Technical Specialist can specialize in certain specific technical areas, or can be generalists.

<http://www.arrl.org/technical-specialist>

# WHAT DOES THE TECHNICAL COORDINATOR REALLY DO?

Your guess is as good as mine.

# WHAT DO THE TECHNICAL COORDINATOR AND TECHNICAL SPECIALISTS DO?

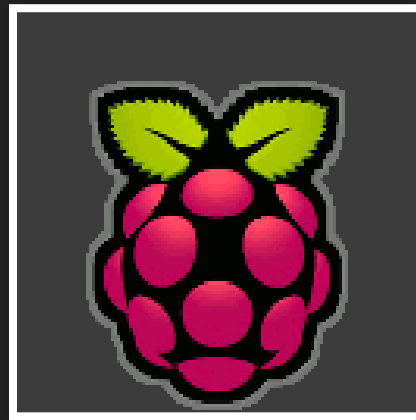
We play around with stuff!!!

# TC RESPONSIBILITIES

- Review Technical Specialist applicants
- [Ohio Section Journal](#) articles
  - Technical in nature, explain for non-techies
  - Encourage and promote ideas
  - Devices, gadgets, projects
  - Reports from Technical Specialists
  - Upcoming meetings, hamfests, or events
- Point of contact for technical and RFI requests
- Available for meetings, hamfests, and conventions

# RASPBERRY PI

## AN INTRODUCTION TO THE CREDIT-CARD SIZED COMPUTER



Jeffrey Kopcak - K8JTK  
Ohio Section Technical Coordinator

# QUÉ ES?

*The Raspberry Pi is a low cost, credit-card sized computer that plugs into a computer monitor or TV, and uses a standard keyboard and mouse. It is a capable little device that enables people of all ages to explore computing, and to learn how to program in languages like Scratch and Python...*

# QUÉ ES?

*...It's capable of doing everything you'd expect a desktop computer to do, from browsing the internet and playing high-definition video, to making spreadsheets, word-processing, and playing games. What's more, the Raspberry Pi has the ability to interact with the outside world, and has been used in a wide array of digital maker projects.*

from: [What Is A Raspberry Pi?](#)


A man with a shaved head, wearing a dark suit jacket over a white shirt, stands in the center of the frame. He is looking directly at the camera with a neutral expression. The background is a blurred outdoor setting with green foliage and some warm-toned lights. In the bottom right corner, there is a small blue structure with wooden spheres and a baton.

Eben Upton, designer of the Raspberry Pi noticed the slide in skill levels while working at Cambridge University's Computer Laboratory in 2006.

Students applying to study computer science had far less experience than previous students.

from: Raspberry Pi for Dummies. img: [IBTimes](#)



A man with a shaved head and a grey sweater over a red shirt is holding a Raspberry Pi circuit board in his right hand. He is standing in front of a large rack filled with many small, labeled compartments, likely for electronic components. The background is slightly out of focus, showing more of the workshop environment.

Eben and his colleagues came up with the idea of creating a computer, that came with necessary tools, sold for \$25, was robust enough to survive a children's book bag, that did interesting things, and drew people to use it.

from: Raspberry Pi for Dummies. img: [Cambridge Judge Business School](#)

# UNINTENDED CONSEQUENCES

The Raspberry Pi was designed to inspire children to take-up programming, but the vast majority of the £25 computers have been bought by adults.

"The reason we've sold so many of these (over a million) is largely is that they've sold to technology capable adults more than they've sold to kids," Upton said. "We think only 10-20%, maybe 30% of the ones we sold have ended up in the hands of kids."

from: [PC Pro](#)

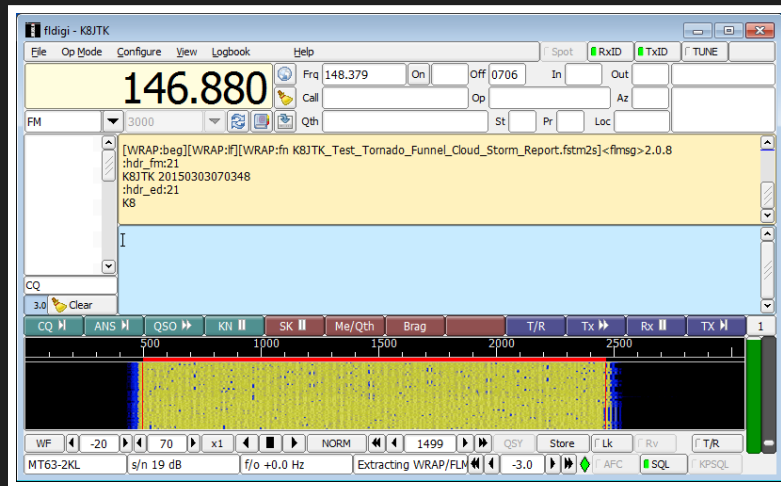
# MORE PI

- Hardware & connectors
- Operating systems
- Raspberry Pi vs. Arduino
- Getting started
- Apps, programming, and projects
- Finding out more

Full version: [Raspberry Pi – An introduction to the credit-card sized computer presentations](#)

# NBEMS

# AN INTRODUCTION USING FLDIGI AND FLMSG



Jeffrey Kopcak - K8JTK  
ARRL Ohio Section Technical Coordinator

# DIGITAL COMMUNICATIONS

Digital is a binary representation of some data (1's and 0's).  
Encoded in a structure before transmission.

Digital is a very broad term and takes many forms:

- **Morse Code (CW)**
- **Voice:** P25, D-STAR, DMR, FreeDV, System Fusion
- **Text and data:** D-STAR, MT63, MFSK, JT65, Olivia, Packet/APRS, PSK31, RTTY, System Fusion

img: KhalilAensland



# WHY DIGITAL?

Wide spread ownership of personal computing devices allows amateurs to develop and use these modes for communication purposes. This includes smartphones and tablets.

When compared to voice communications, digital can be:

- **Faster:** Transmit more words per minute
- **Reliable:** Greater distances. Poorer conditions. Forward error correction (redundant encoding to reconstruct lost data without retransmission).

Each mode has applications, uses, advantages, and disadvantages.

# ENTER NBEMS

NBEMS stands for Narrow Band Emergency Messaging System (or Software).

Established standards for passing email and text-based traffic over Amateur Radio.



David H Freese, Jr.  
W1HKJ



Howard (Skip) Teller  
KH6TY

# NBEMS PHILOSOPHY

- Utilize radios, software, and hardware that are used in every day ham radio (familiarity)
- Inexpensive. All can participate. Older computers can be used.
- Simple. No steep learning curve in an emergency situation but flexible.
- Independent of infrastructure



img: [RCARC](#)



# MORE NBEMS

- Emcomm
- Interfacing digital modes
- Fldigi
- MT63-2KL & Olivia
- Flmsg
- Setup Fldigi and Flmsg
- Workflow
- Hands on & demonstrations

Full version: [NBEMS – An Introduction Using Fldigi and Flmsg Presentations](#)

# TROUBLESHOOTING RADIO FREQUENCY INTERFERENCE



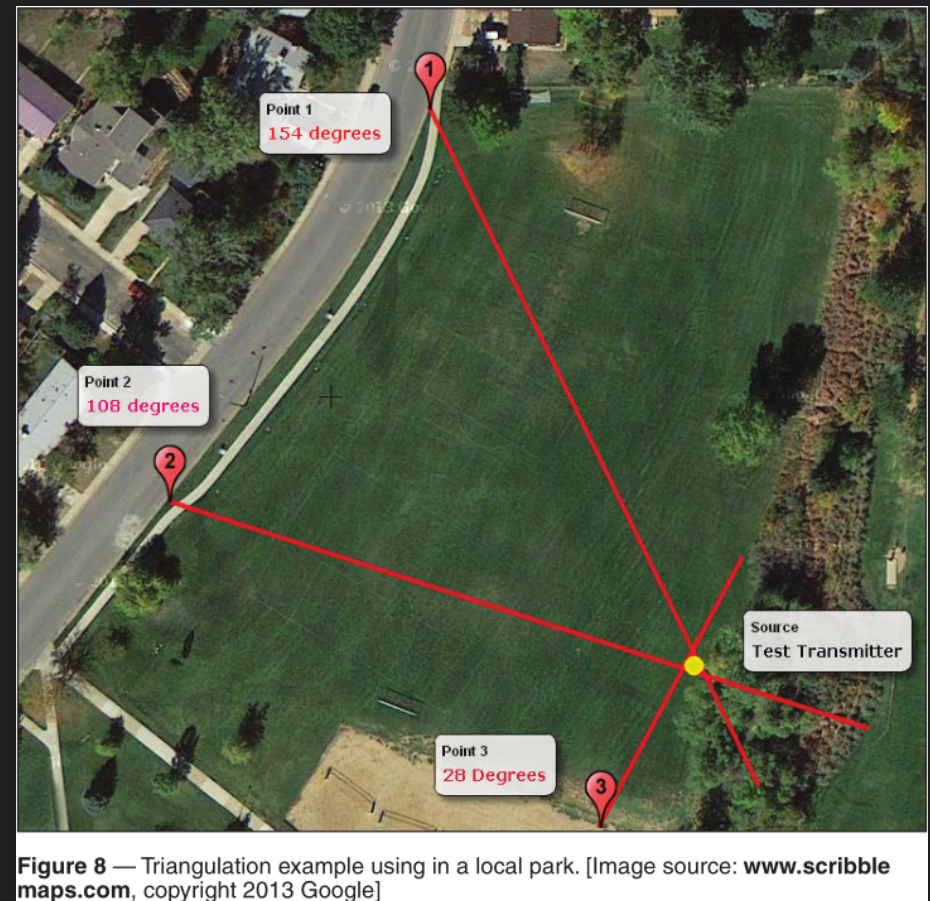
img: [ARRL RFI](#)

# TROUBLESHOOTING HF RADIO FREQUENCY INTERFERENCE

- Determine if the noise source is internal
- Shut off circuit breakers, all devices with batteries
- Radio will need a battery source
- Turn them on one breaker at a time until noise returns
- Unplug all devices on that breaker and plug in until noise returns
- Small AM radio may help in this situation

# TROUBLESHOOTING RFI: EXTERNAL

- Need loop antenna, spectrum analyzer, or portable HF receiver
- Loop is bidirectional. Find null rather than peak.
- Null indicates the noise is 90 degrees from the loop
- May need to triangulate the source
- Impossible with non-directional antenna (whips, wire)



img: [Locating RF Interference at HF](#)

# TROUBLESHOOTING RFI: EXTERNAL

- Keep good notes of findings and contacts
- May never find source, no access to building or facility
- Rule out **everything** else
- Most owners/service technicians are willing to help out, to an extent
- Contact utility companies
- **Always** remain cool, calm, and collected

Can't find it? Need help?

- Technical Specialists in the area
- Referral to an ARRL technical resource

# TROUBLESHOOTING RFI: RESOURCES

Web: [ARRL RFI](#)

QST: [Locating RFI at HF](#)

Book: [ARRL RFI Book](#)

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Video: [Noise sources](#)

Video: [Tips for identifying noise in your house](#)

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[MFJ Ultra-Sonic Receiver](#)

Video: [Demonstration](#)

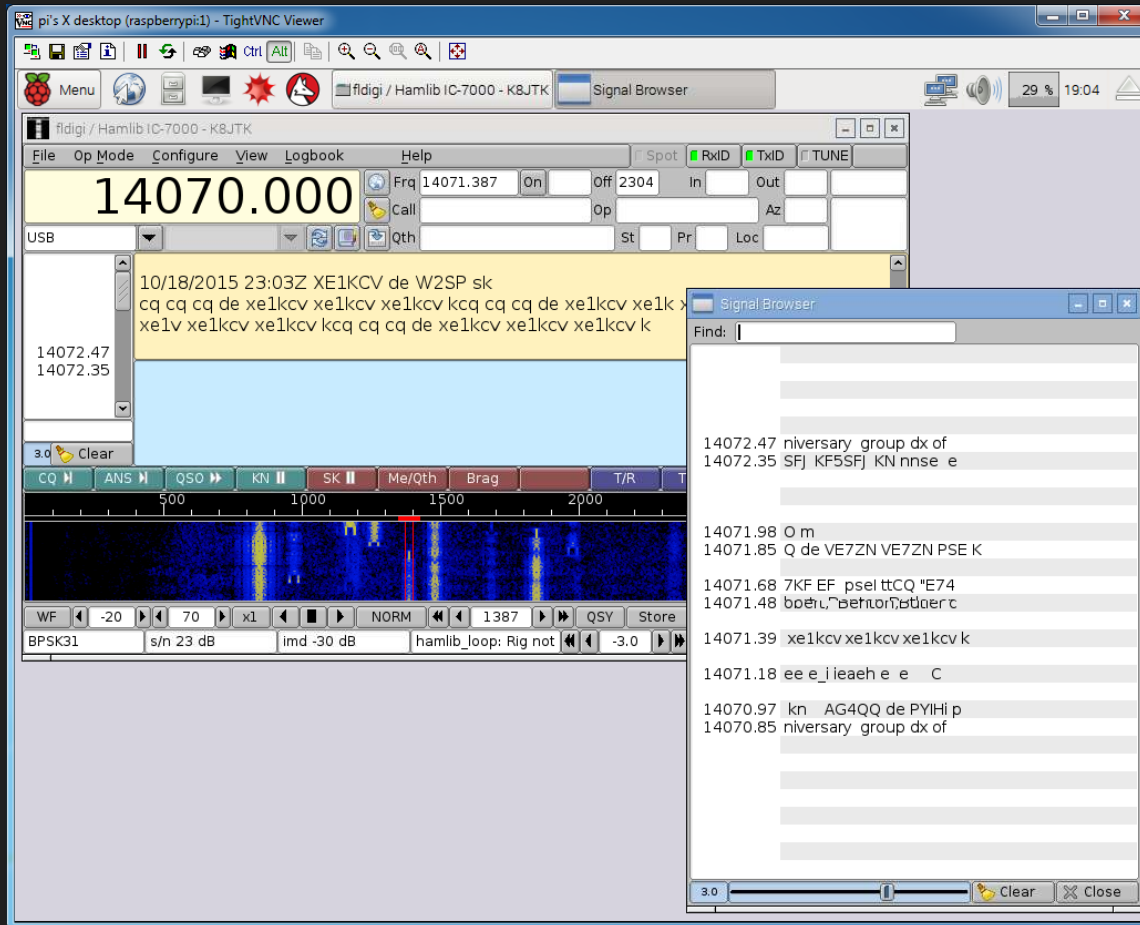
Ham Nation 92: AES SuperFest & Smoke&Sol...



Ham Nation 112: How To Use an Oscilloscope



# FLDIGI ON THE RASPBERRY PI

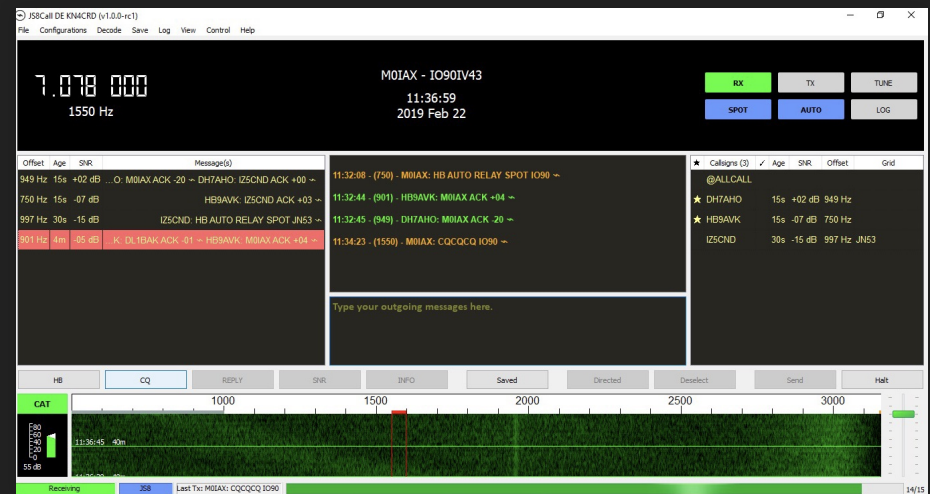


How to: Running Fldigi Flmsg and Flwrap on the Raspberry  
Pi 2

# WHAT'S NEXT??

Who really knows?

- FT4
- JS8Call
- Ham Radio VoIP cluster
- Digital Communications in Amateur Radio articles
- ARDEN



JS8Call



# THE END

## JEFFREY KOPCAK - K8JTK

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- [K8JTK@arrl.net](mailto:K8JTK@arrl.net)
- This presentation is available on my website: [K8JTK.org](http://K8JTK.org)
- [Ohio Section](#)