DCFluX in:

License to Transmit

Presented By:

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Chief Engineer, New West Broadcasting Systems, Inc.

DEFCON 19; Las Vegas, NV


FLUX
RESEARCH



“Where have all the weirdos gone?”

--Moxie Marlinspike

Hidden Agenda

0. About the Author
1. Fuck Your Stupid Smart Phone
2. Amateur Radio
3. Getting Started
4. Commercial To Amateur Hacks
5. General Incompetence

0. About the Author

- Matt Krick
- “DCFluX”
- Video Editor
- Broadcast Engineer
  - 1998 to Present
- K3MK
  - Licensed to Transmit, 1994 to Present



1. Fuck Your Stupid Smart Phone

Radio Merit Badge



1. Fuck Your Stupid Smart Phone



1. Fuck Your Stupid Smart Phone







Phone Calls

- Phone Patch
- Auto Patch

1. Fuck Your Stupid Smart Phone

Push To Talk

- Frequency Modulation
- Amplitude Modulation
  - Single Side Band
- Digital Modulation
  - Project 25

1. Fuck Your Stupid Smart Phone

Text Messaging

- Morse Code
  - CW
- Radio Teletype
  - RTTY
  - Baudot
- Packet
  - AX.25
- Phase Shift Keying
  - PSK31

1. Fuck Your Stupid Smart Phone

Picture Mail

- SSTV (Slow Scan Television)
- Packet

1. Fuck Your Stupid Smart Phone

Video Chat

- ATV (Amateur Television)
  - Amplitude Modulated
  - Frequency Modulated
- D-ATV (Digital Amateur Television)
  - 8-VSB
  - COFDM
  - DSS

1. Fuck Your Stupid Smart Phone

Location Awareness

- APRS (Amateur Packet Reporting System)

1. Fuck Your Stupid Smart Phone

Internet Access

- Long Range WiFi
  - 902 – 928 MHz
- 2.4 GHz (802.11b)
  - 2400 – 2450 MHz
- 5.7 GHz (802.11a)
  - 5680 – 5825 GHz

Up to 1500 W PEP (+62 dBm)

1. Fuck Your Stupid Smart Phone

App Store



1. Fuck Your Stupid Smart Phone

No Phone Company Required



1. Fuck Your Stupid Smart Phone



Yaesu
FT-530

1. Fuck Your Stupid Smart Phone







1. Fuck Your Stupid Smart Phone



Kenwood
TH-77A

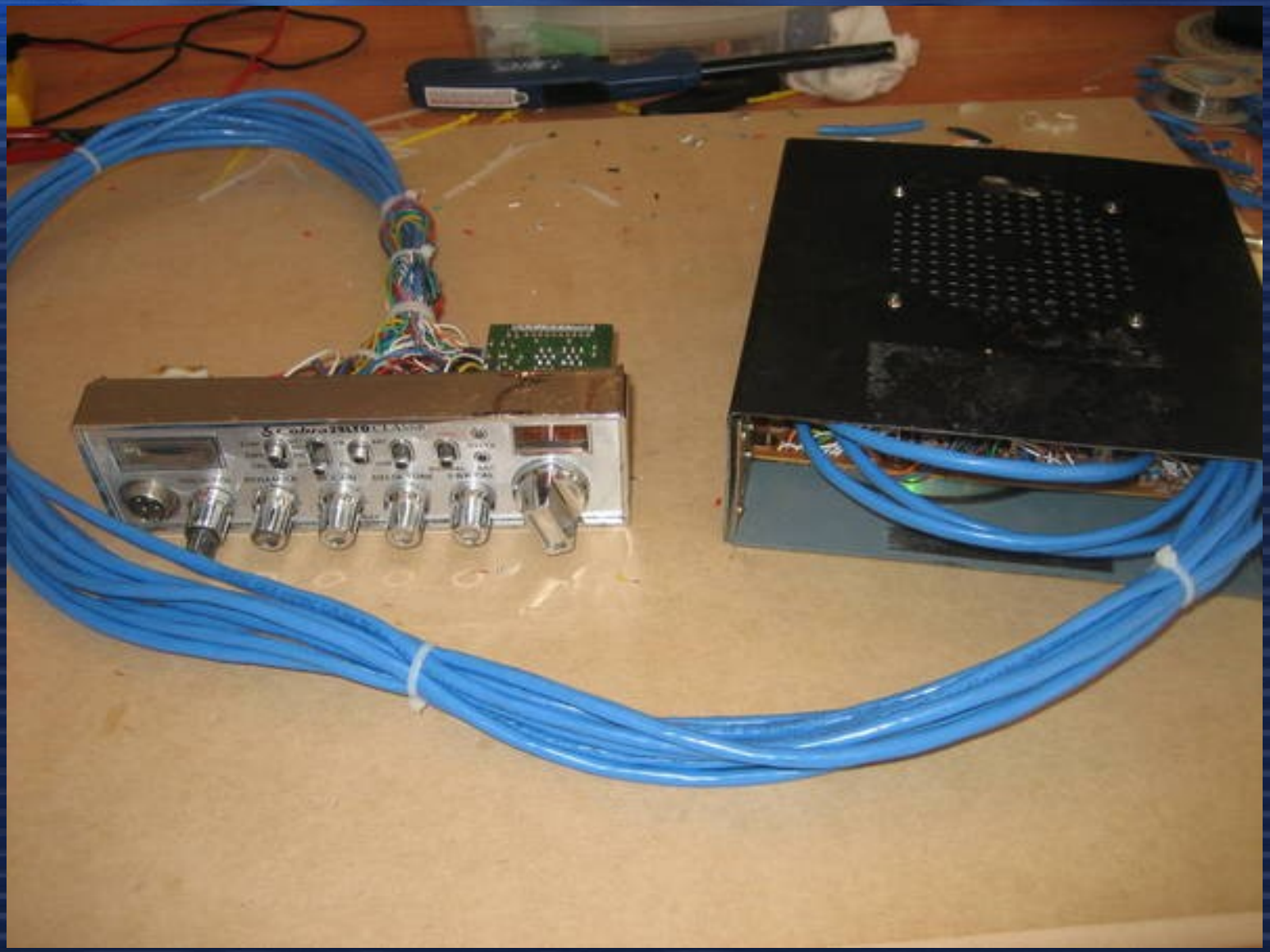
FluX Makes Things Simple

Citizens' Band

≠

Amateur Radio

2. Amateur Radio



2. Amateur Radio



2. Amateur Radio



2. Amateur Radio



FluX Makes Things Simple

FRS, GMRS, MURS

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Amateur Radio

2. Amateur Radio



2. Amateur Radio



2. Amateur Radio



2. Amateur Radio



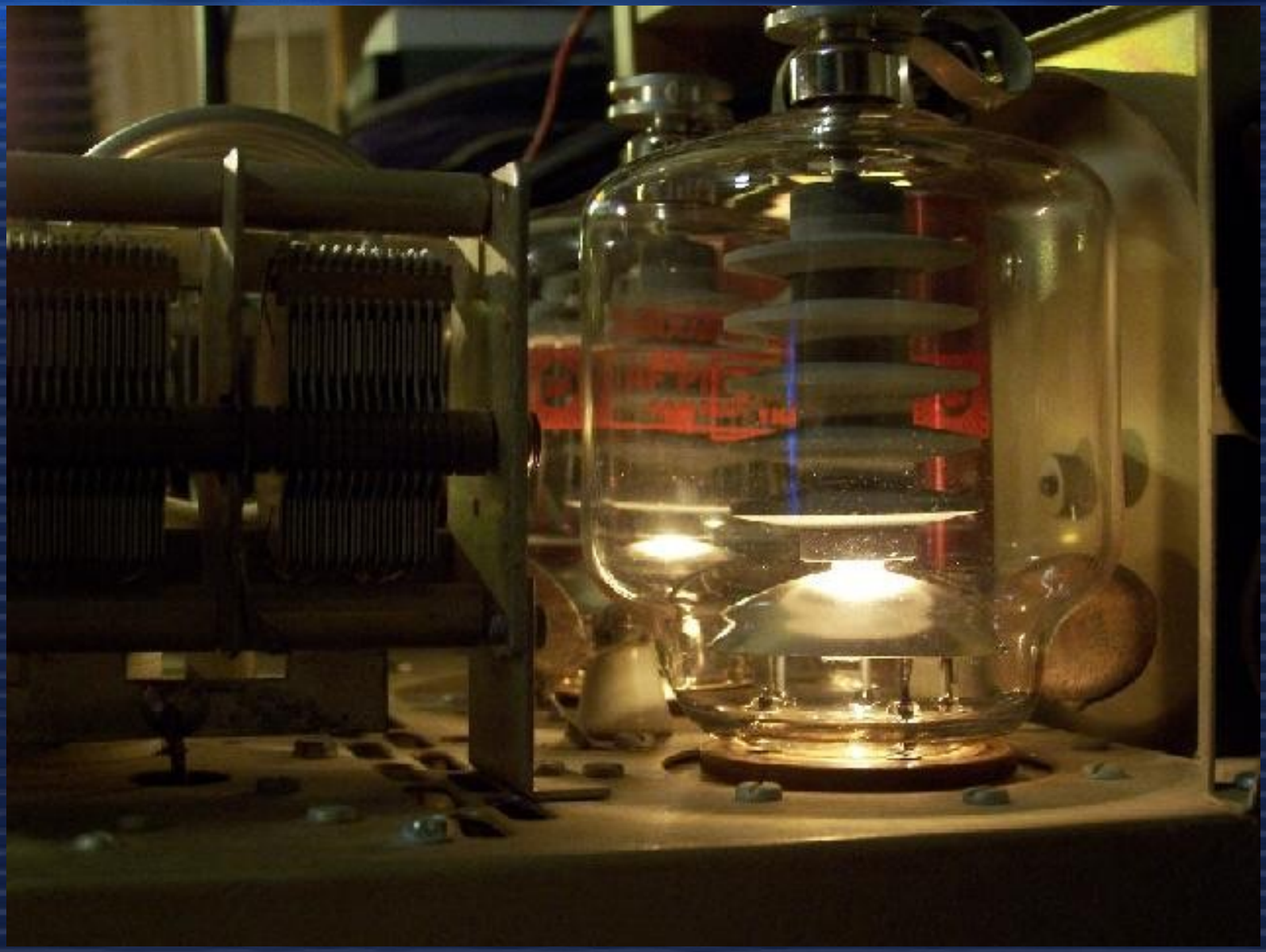
2. Amateur Radio



2. Amateur Radio



2. Amateur Radio



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2. Amateur Radio



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2. Amateur Radio



2. Amateur Radio



FluX Makes Things Simple



FCC

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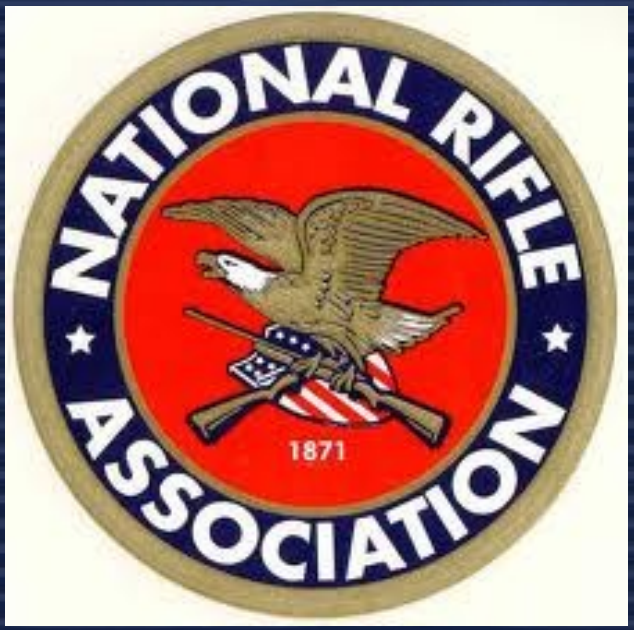
“The Man”

2. Amateur Radio

FluX Makes Things Simple



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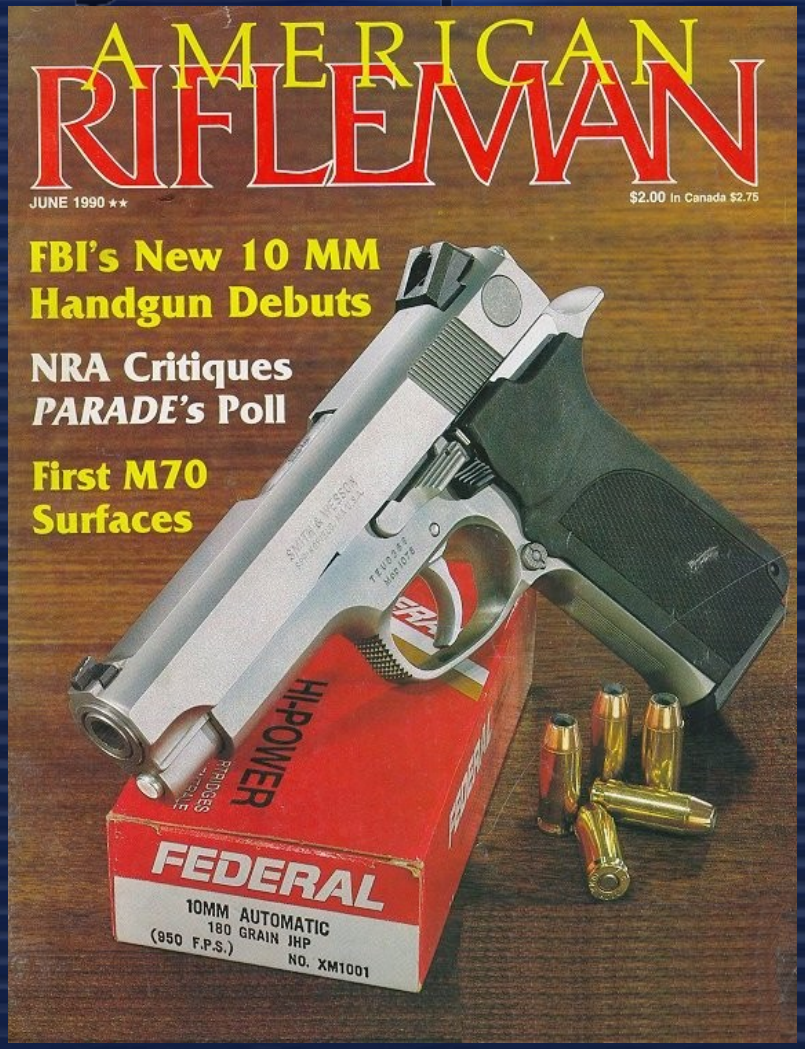


2. Amateur Radio

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Amateur Radio Spectrum

- 160m
  - 1.8 – 2.0 MHz
- 80m
  - 3.5 – 4.0 MHz
- 60m*
  - 5.3 – 5.4 MHz
- 40m
  - 7.1 – 7.3 MHz
- 30m
  - 10.1 – 10.15 MHz
- 20m
  - 14.0 – 14.35 MHz
- 17m
  - 18.068 – 18.168 MHz
- 15m
  - 21.1 – 21.450 MHz
- 12m
  - 24.89 – 24.99 MHz
- 10m
  - 28.0 – 29.7 MHz

Amateur Radio Spectrum

- 6m
  - 50 – 54 MHz
- 2m
  - 144 – 148 MHz
- 1.25m
  - 219 – 220 MHz
  - 222 – 225 MHz
- 70cm
  - 420 – 450 MHz
- 33cm
  - 902 – 928 MHz
- 23cm
  - 1.24 – 1.3 GHz
- 13cm
  - 2.3 – 2.31 GHz
  - 2.39 – 2.45 GHz

And More!

Bandwidth of Popular Modes

	Minimum	Maximum
SSCW (Morse Code)	0.1 Hz	20 Hz
CW (Morse Code)	20 Hz	150 Hz
RTTY	270 Hz	370 Hz
PSK31	-	37.5 Hz
Side Band Phone	2.4 kHz	3 kHz
AM Phone	5 kHz	10.2 kHz
FM Phone	8 kHz	16 kHz
AM Television	6 MHz	10 MHz
WiFi Data	1 MHz	22 MHz

Build Your Own Mode

- Analog Telemetry
- Vestigial Side Band Voice
- Super Slow Analog Data
- Digital Voice
- Digital Data
- Digital Television
- Analog HDTV

Surprise Me!

Some Restrictions Apply

- ID Transmissions
  - Every 10 minutes
- No obscuring the meaning of communication
- No Encryption
  - Unless commanding a satellite
- No Broadcasting
  - No music, unless part of a NASA rebroadcast
- No Swearing
  - Don't use the Seven Dirty Words

And More!

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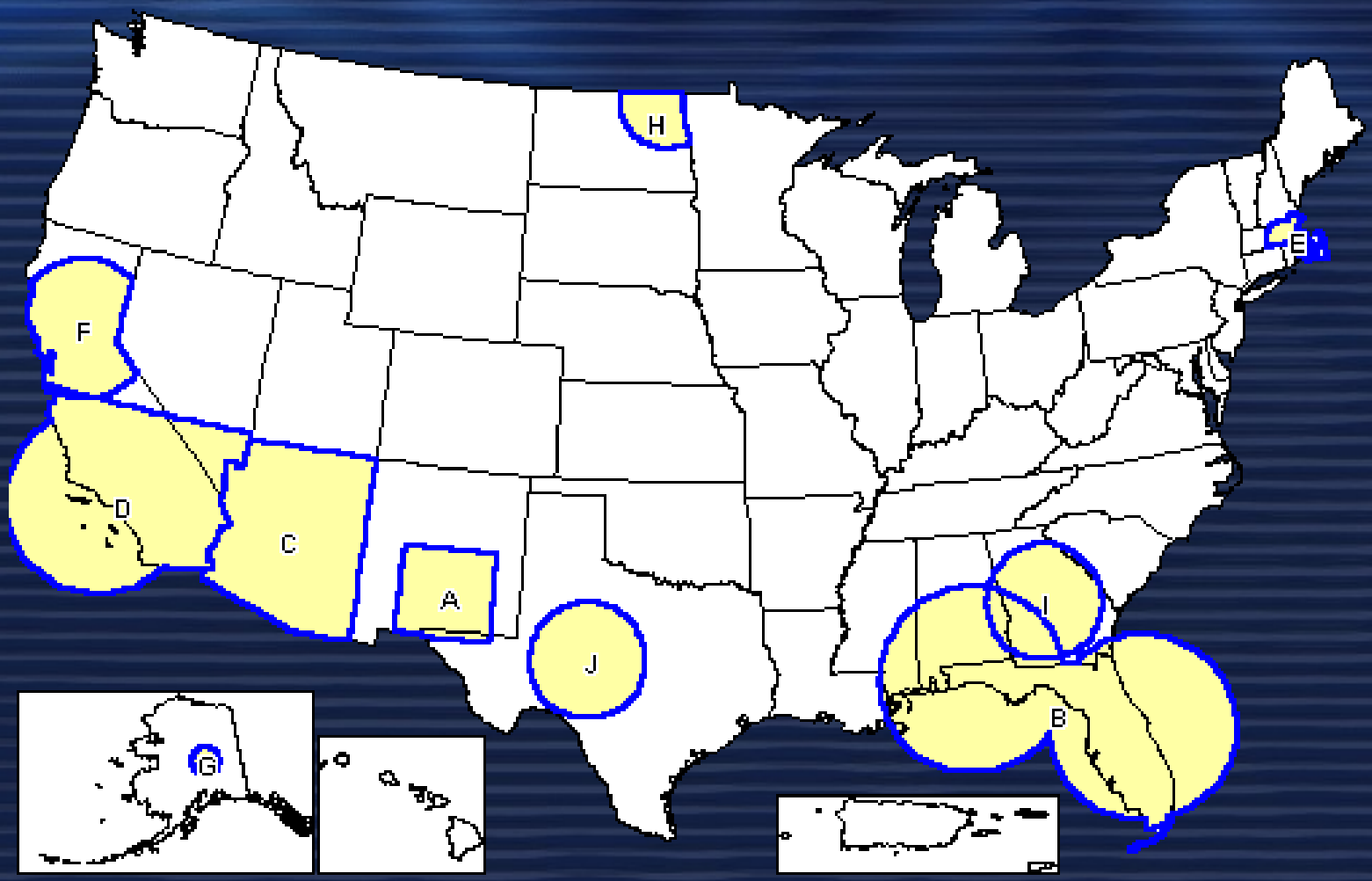
Don’t be an
ass-hat on
Amateur Radio.

The Good Stuff

- 1500 W PEP on most bands
  - 50 W PEP on 60m
  - 200 W PEP on 30m
  - 50 W PEP on 70cm in some locations
- Unlimited ERP
- Experimental ‘Test’ Modes allowed on all bands
  - Pulse and Spread Spectrum Limited
- Unlimited Bandwidth on 33cm and above

2. Amateur Radio

47 CFR 2.106 Footnote US7



FluX Makes Things Simple

- PEP = Peak Envelope Power
  - Peak Power at leaving the transmitter
- ERP = Effective Radiated Power
  - Power in to the radio horizon after feed line loss and antenna gain

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Higher Antenna Gain

=

Narrower Beamwidth

Classes of Operator

1. Novice
2. Technician (No Code)
3. General
4. Advanced
5. Extra

Classes of Operator

1. Technician
2. General
3. Extra

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No Morse Code requirement

3. Getting Started

1. Technician

- All Privileges on 6m and Up
  - 200 W PEP below 6m
  - CW only on 80m, 40m, 15m
  - CW, RTTY and Data on 10m
  - SSB Voice on 10m 28.3 – 28.5 MHz

3. Getting Started

2. General

All Technician privileges plus:

- Most HF privileges
  - 400 kHz of bandwidth reserved for Advanced and Extra
- Ability to administer VE Technician tests

3. Getting Started

3. Extra

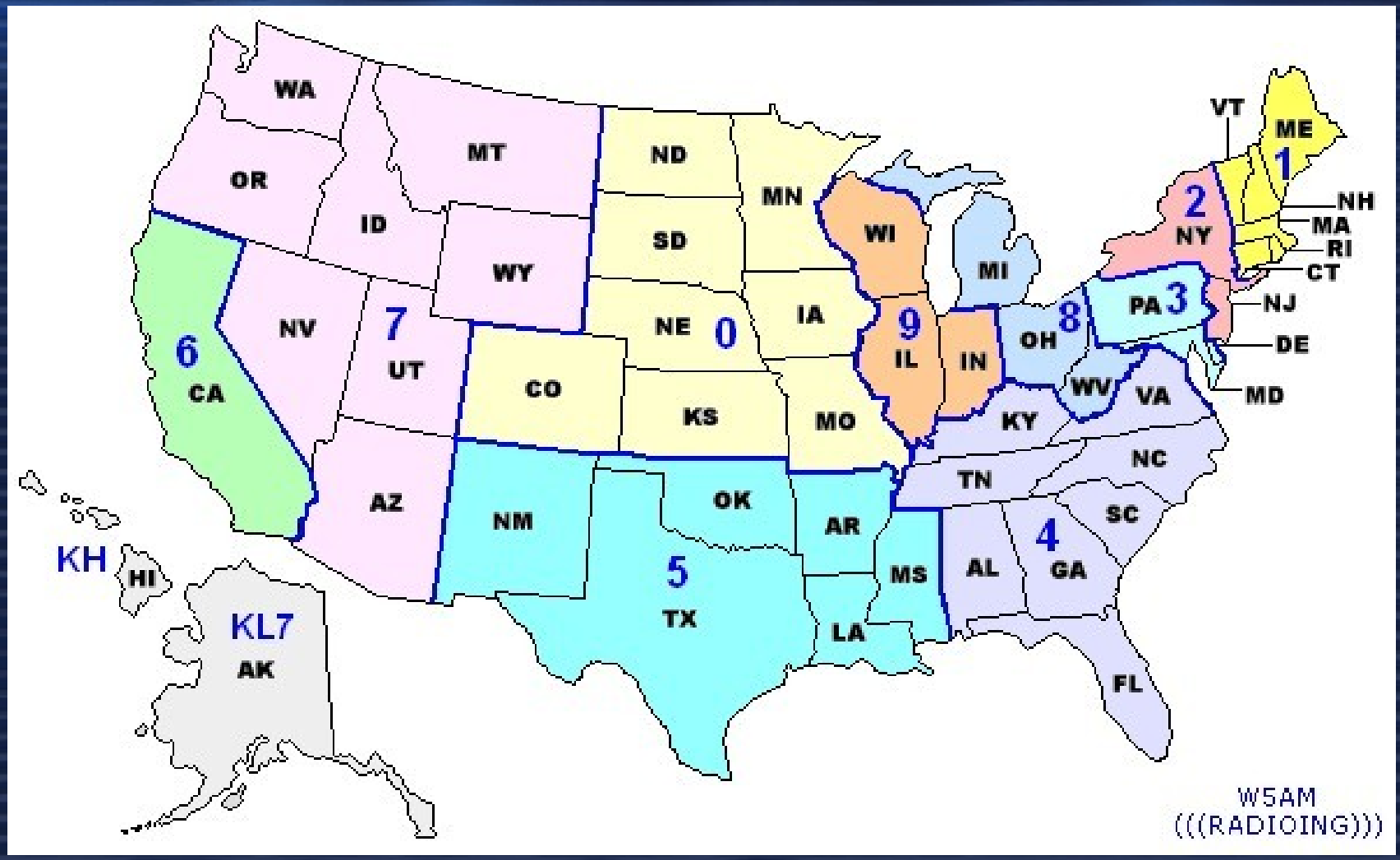
All Technician and General privileges plus:

- All frequency privileges
- Ability to administer all VE tests
- Entitled to Class A and Class B call signs

3. Getting Started



Call Sign Regions



3. Getting Started

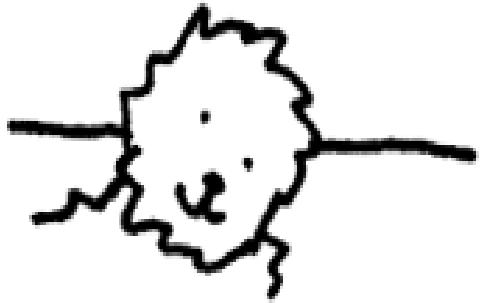
basic electronics symbols:



resistor



capacitor



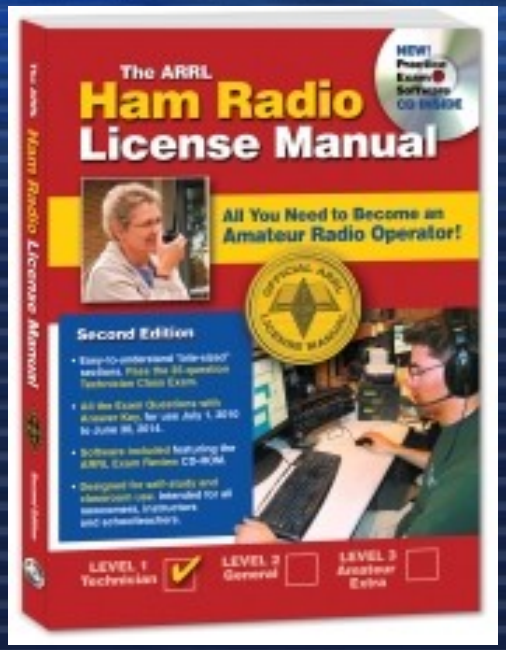
JESUS CHRIST
IT'S A LION
GET IN THE
CAR

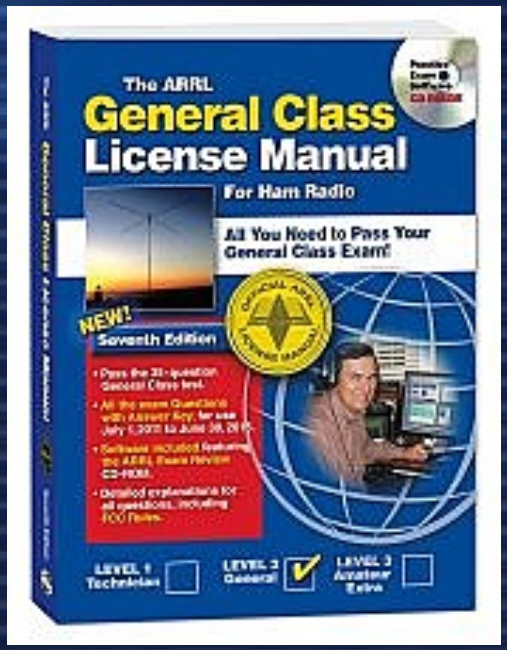
3. Getting Started

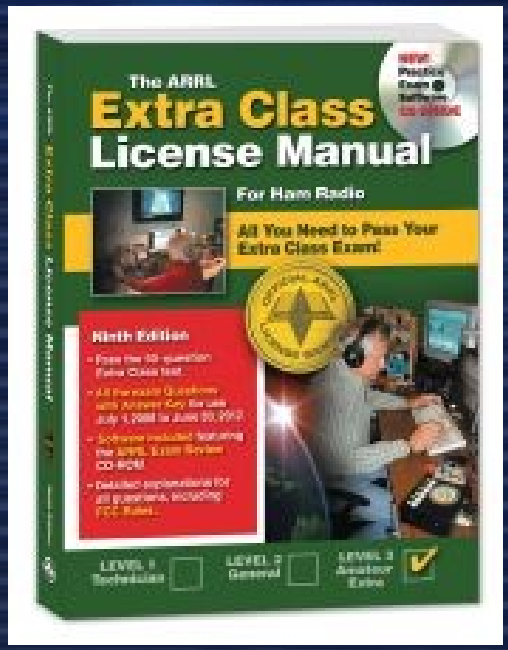


Amateur Electronic Supply
4640 Polaris Ave.
(800) 634-6227

3. Getting Started







$25 - 30 Each

Free Online Resources

- www.arrl.org/question-pools
- www.arrl.org/exam-practice
- www.qrz.com/exams
- www.eham.net/exams

Questions Pool Size

	Questions Pool	Questions on exam	Passing grade
Technician	396	35	26
General	456	35	26
Extra	738	50	37

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Cost of Exam:

$15

3. Getting Started

DEFCON 16 VE Team



3. Getting Started

Ass Kicked By A Blind Man



3. Getting Started

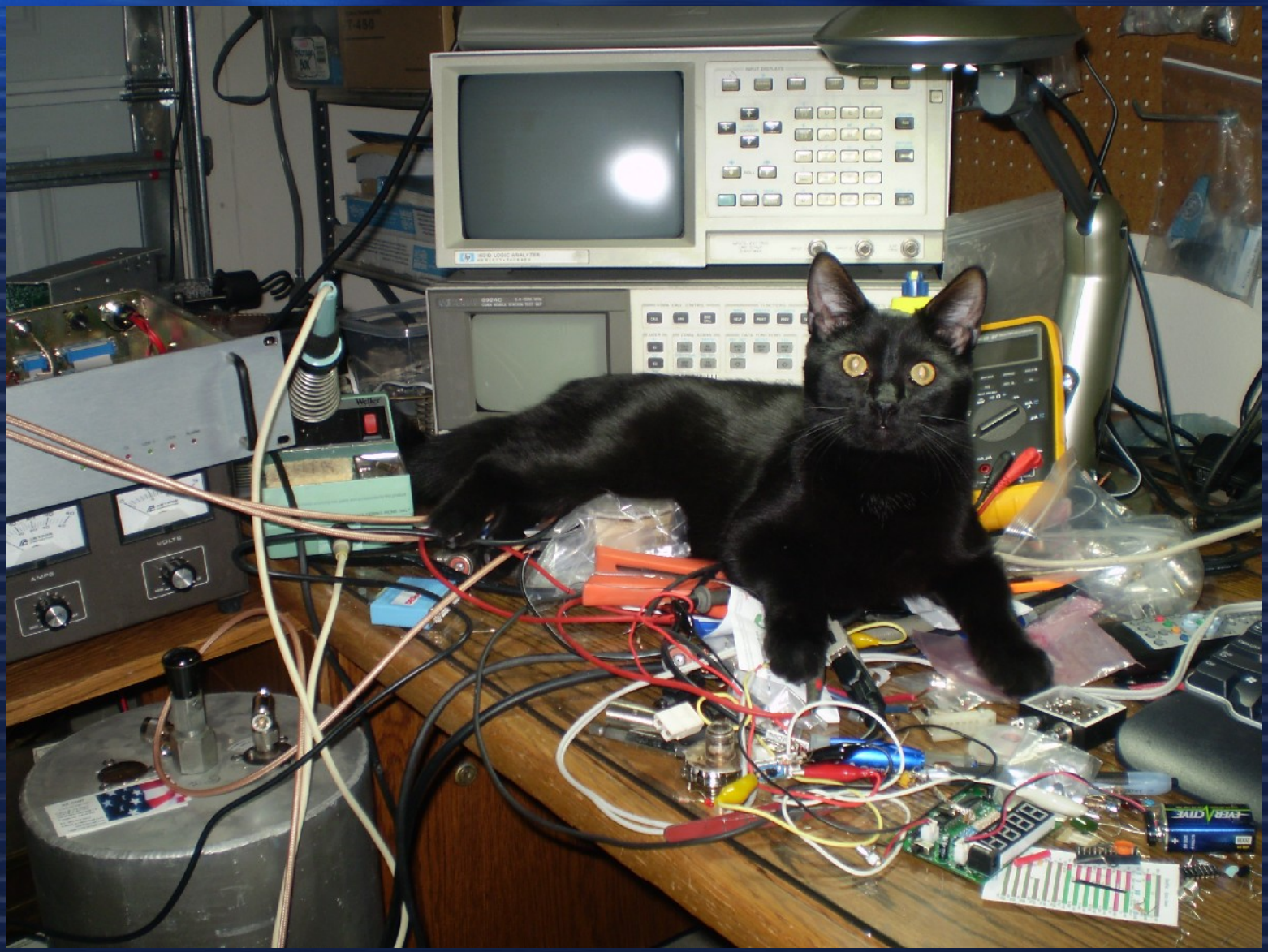
Ass Kicked By A Girl



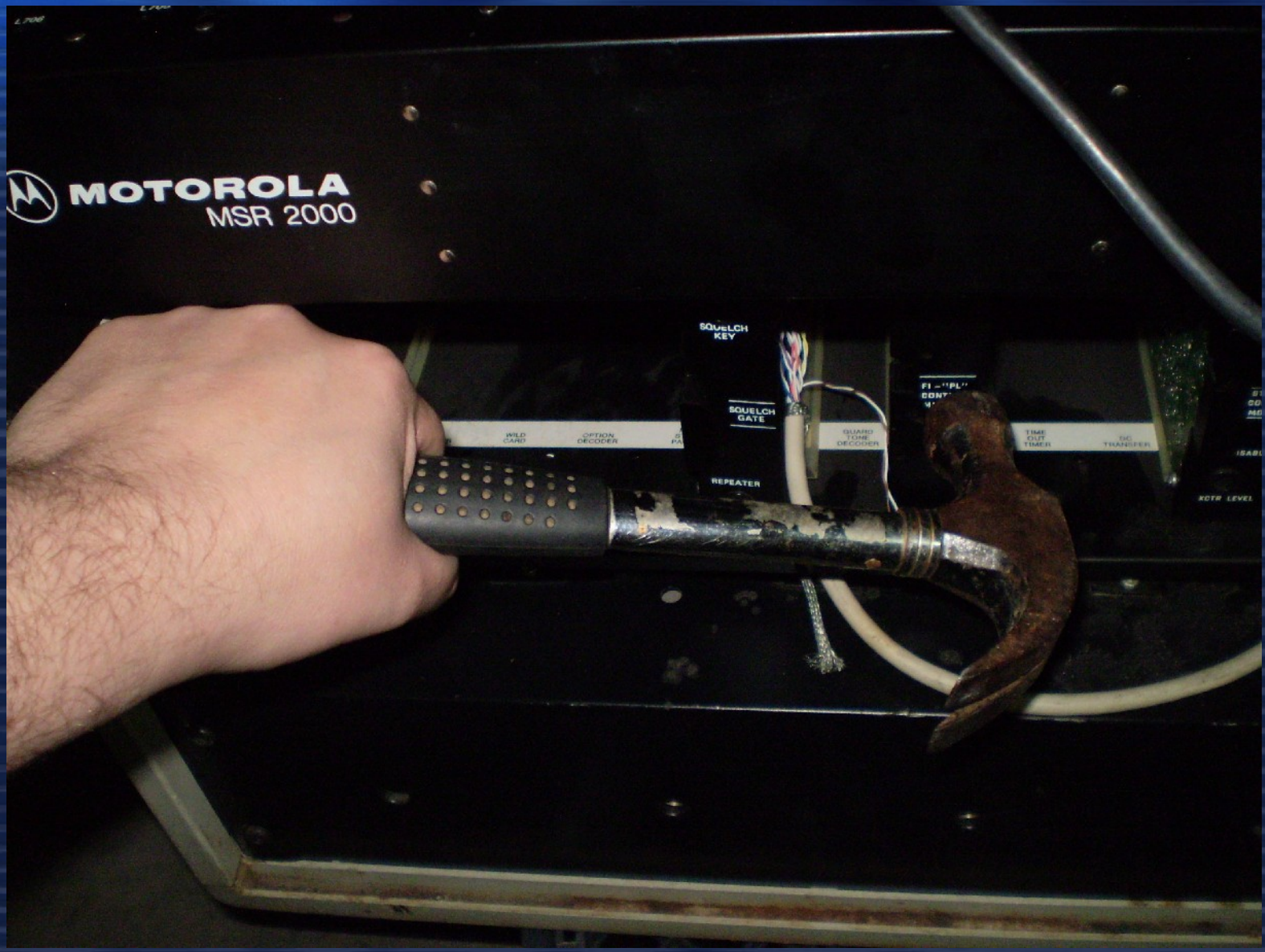
Golden Age of Amateur Radio

- 1st Narrow Banding (1963)
  - 15 kHz FM Deviation to 5 kHz
  - 50 kHz Channel Spacing to 15 and 25 kHz
- 2nd Narrow Banding (2013)
  - 5 kHz Deviation to 2.5 kHz
  - UHF
    - 25 kHz Channel Spacing to 12.5 kHz
  - VHF
    - 15 kHz Channel Spacing to 7.5 kHz

4. Commercial To Amateur Hacks



4. Commercial To Amateur Hacks



4. Commercial To Amateur Hacks



4. Commercial To Amateur Hacks

150-174 MHz to 144-148 MHz



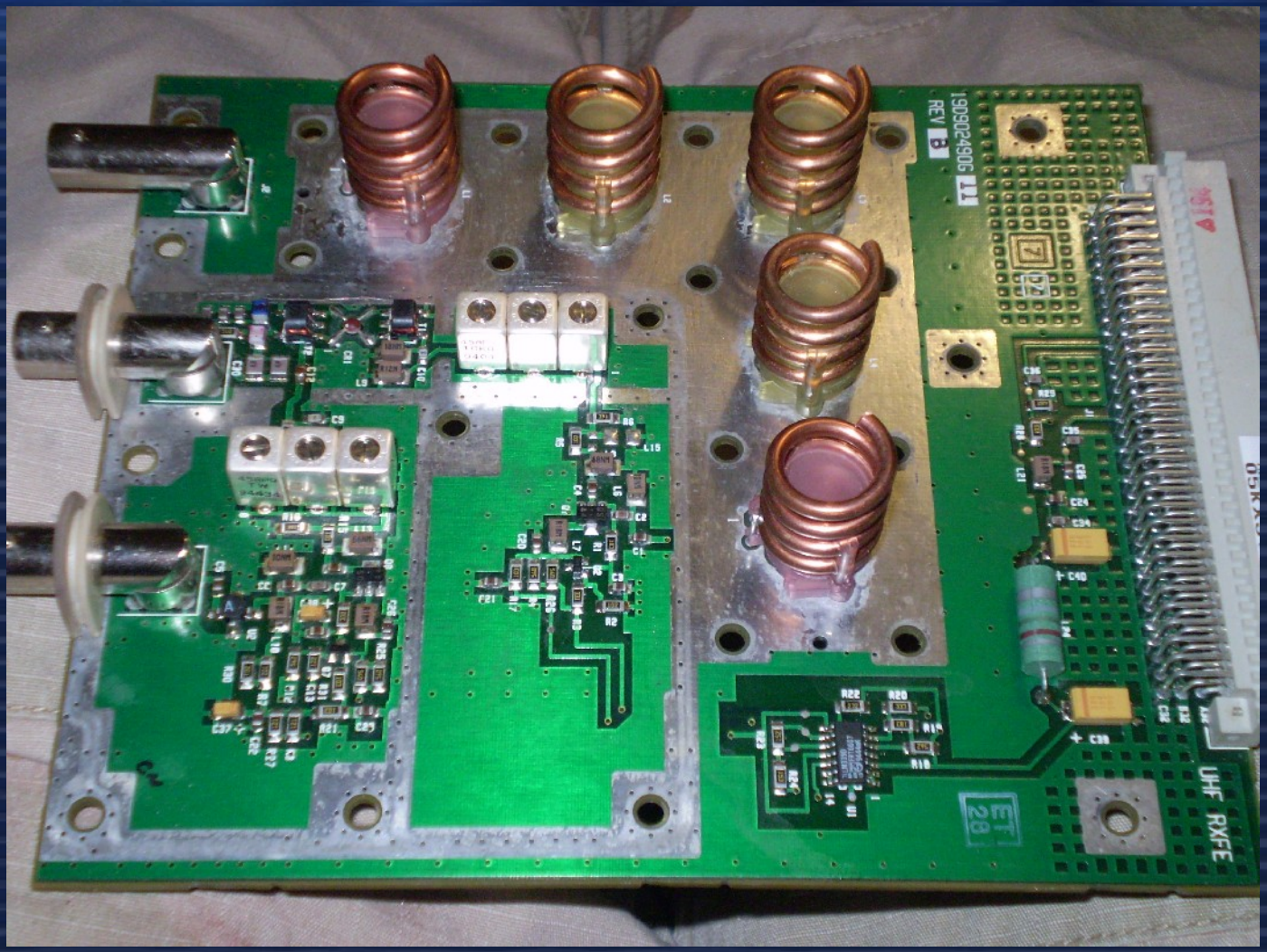
4. Commercial To Amateur Hacks

150-174 MHz to 144-148 MHz



4. Commercial To Amateur Hacks

403-420 MHz to 440-450 MHz



4. Commercial To Amateur Hacks

450-470 MHz to 440-450 MHz



4. Commercial To Amateur Hacks

450-470 MHz to 440-450 MHz

- GE MASTR-II Receiver Tin Whiskers





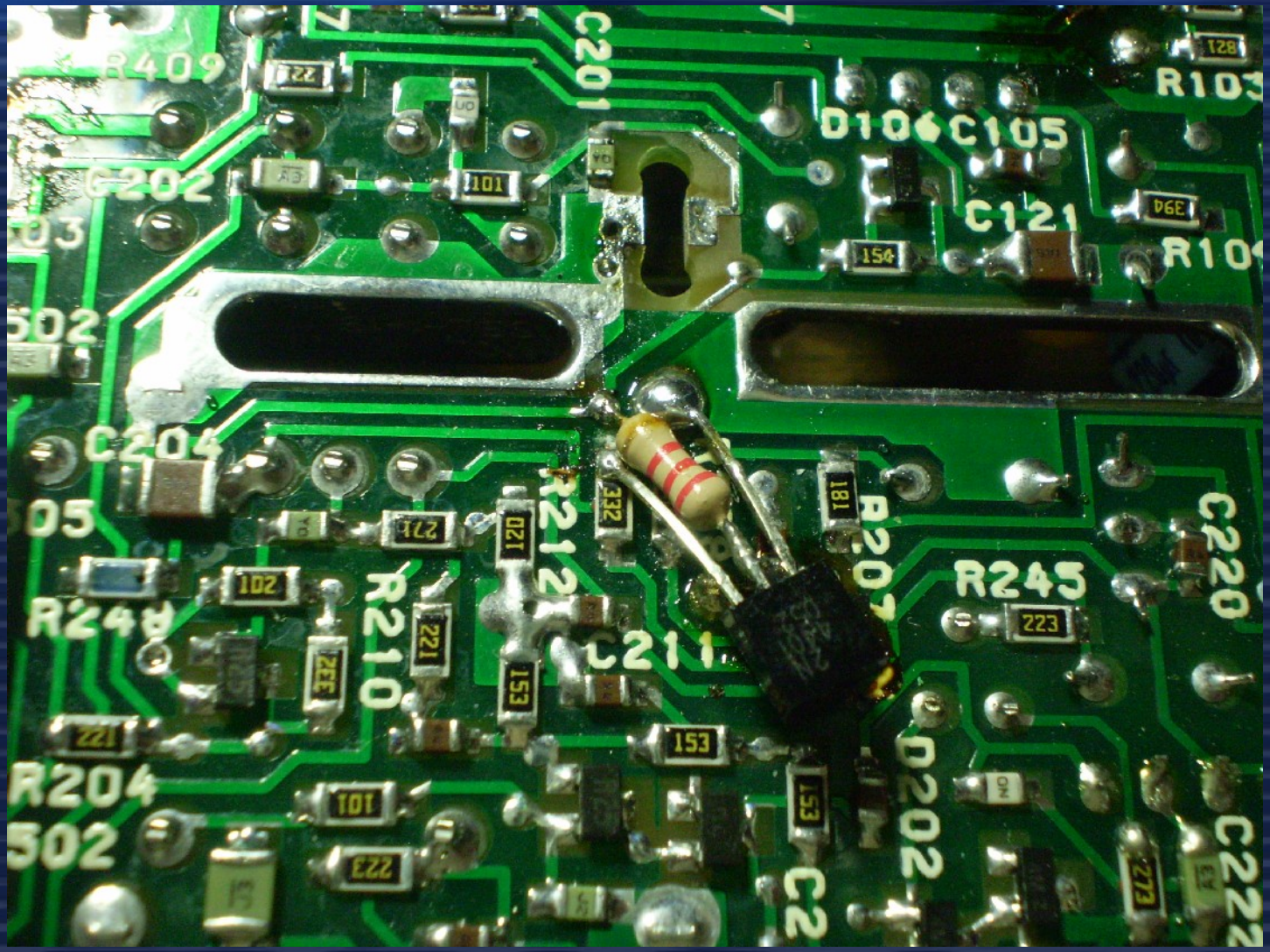
4. Commercial To Amateur Hacks

150-174 MHz to 222-225 MHz



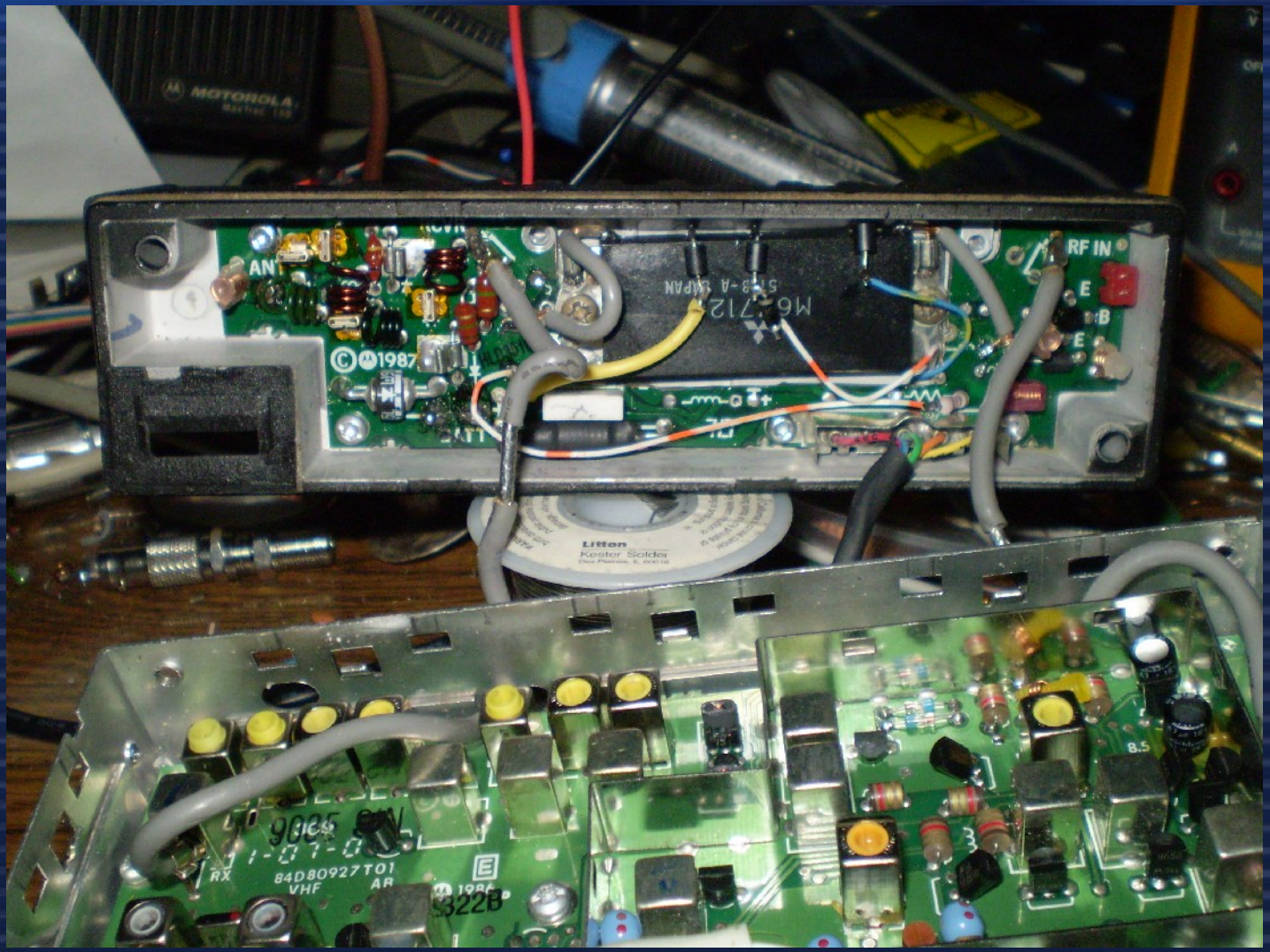
4. Commercial To Amateur Hacks

150-174 MHz to 222-225 MHz



4. Commercial To Amateur Hacks

150-174 MHz to 222-225 MHz



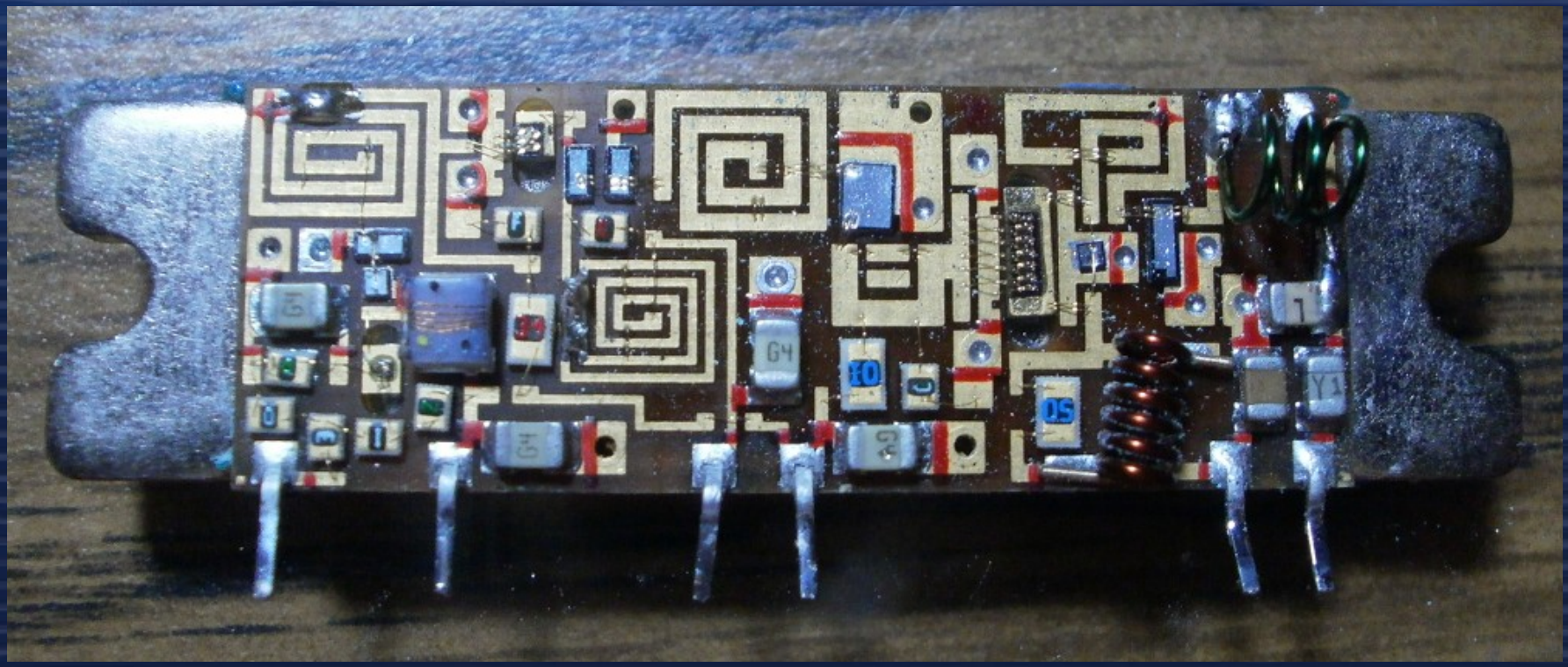
4. Commercial To Amateur Hacks

150-174 MHz to 222-225 MHz



4. Commercial To Amateur Hacks

150-174 MHz to 222-225 MHz



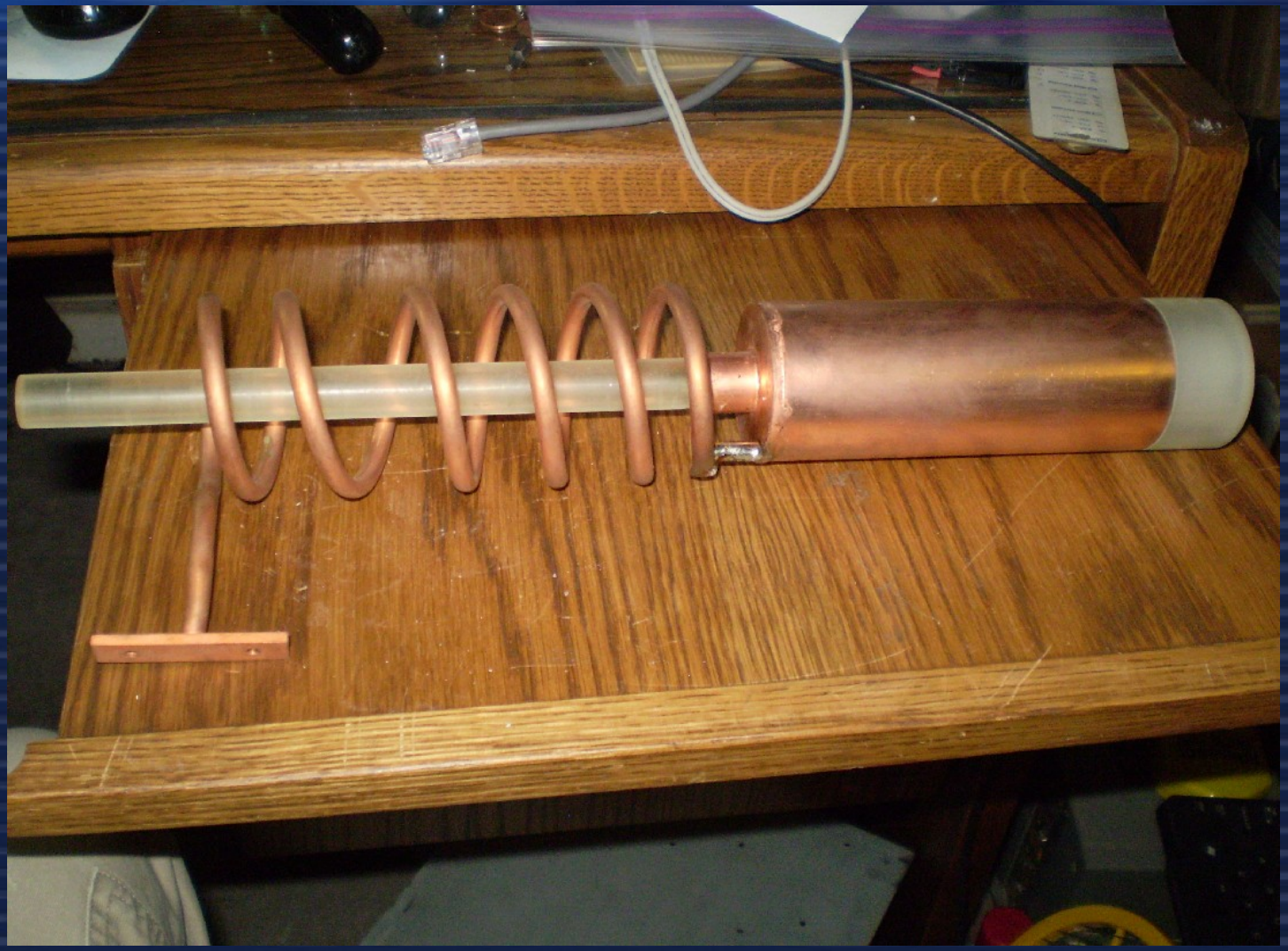
4. Commercial To Amateur Hacks

40-50 MHz to 50-54 MHz



4. Commercial To Amateur Hacks

40-50 MHz to 50-54 MHz



5. General Incompetence



5. General Incompetence



5. General Incompetence



5. General Incompetence



5. General Incompetence



5. General Incompetence



DCFluX in: License to Transmit

Questions?

In the Q&A Room

matt@kgmn.net

FLUX RESEARCH

2. Amateur Radio

A Series of Tubes





