DCFluX in:
License to Transmit

Presented By:
Matt Krick, DCFluX – K3MK
Chief Engineer, New West Broadcasting Systems, Inc.

DEFCON 19; Las Vegas, NV
“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
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
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)
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
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

Kenwood
TH-77A
Citizens’ Band ≠ Amateur Radio
2. Amateur Radio
2. Amateur Radio
2. Amateur Radio

- Frequency: 27.48500
- Signal Level: S9
- Mode: USB
- Voltage: 13.9V
2. Amateur Radio
FluX Makes Things Simple

FRS, GMRS, MURS ≠ Amateur Radio
2. Amateur Radio
2. Amateur Radio
2. Amateur Radio
2. Amateur Radio
2. Amateur Radio
2. Amateur Radio
2. Amateur Radio
2. Amateur Radio
2. Amateur Radio
2. Amateur Radio
2. Amateur Radio
2. Amateur Radio
2. Amateur Radio
2. Amateur Radio
2. Amateur Radio
2. Amateur Radio
2. Amateur Radio

Image: Woman standing next to a sign that reads "STILL A VIRGIN? FOR HELP CALL 888-743-4335 TOLL FREE".
2. Amateur Radio
FluX Makes Things Simple

FCC = “The Man”
2. Amateur Radio

FluX Makes Things Simple
2. Amateur Radio

FluX Makes Things Simple
## Amateur Radio Spectrum

<table>
<thead>
<tr>
<th>Band</th>
<th>Frequency Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>160m</td>
<td>1.8 – 2.0 MHz</td>
</tr>
<tr>
<td>80m</td>
<td>3.5 – 4.0 MHz</td>
</tr>
<tr>
<td>60m*</td>
<td>5.3 – 5.4 MHz</td>
</tr>
<tr>
<td>40m</td>
<td>7.1 – 7.3 MHz</td>
</tr>
<tr>
<td>30m</td>
<td>10.1 – 10.15 MHz</td>
</tr>
<tr>
<td>20m</td>
<td>14.0 – 14.35 MHz</td>
</tr>
<tr>
<td>17m</td>
<td>18.068 – 18.168 MHz</td>
</tr>
<tr>
<td>15m</td>
<td>21.1 – 21.450 MHz</td>
</tr>
<tr>
<td>12m</td>
<td>24.89 – 24.99 MHz</td>
</tr>
<tr>
<td>10m</td>
<td>28.0 – 29.7 MHz</td>
</tr>
</tbody>
</table>
2. Amateur Radio

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!
# 2. Amateur Radio

## Bandwidth of Popular Modes

<table>
<thead>
<tr>
<th>Mode</th>
<th>Minimum</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>SSCW (Morse Code)</td>
<td>0.1 Hz</td>
<td>20 Hz</td>
</tr>
<tr>
<td>CW (Morse Code)</td>
<td>20 Hz</td>
<td>150 Hz</td>
</tr>
<tr>
<td>RTTY</td>
<td>270 Hz</td>
<td>370 Hz</td>
</tr>
<tr>
<td>PSK31</td>
<td>-</td>
<td>37.5 Hz</td>
</tr>
<tr>
<td>Side Band Phone</td>
<td>2.4 kHz</td>
<td>3 kHz</td>
</tr>
<tr>
<td>AM Phone</td>
<td>5 kHz</td>
<td>10.2 kHz</td>
</tr>
<tr>
<td>FM Phone</td>
<td>8 kHz</td>
<td>16 kHz</td>
</tr>
<tr>
<td>AM Television</td>
<td>6 MHz</td>
<td>10 MHz</td>
</tr>
<tr>
<td>WiFi Data</td>
<td>1 MHz</td>
<td>22 MHz</td>
</tr>
</tbody>
</table>
2. Amateur Radio

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

2. Amateur Radio

- 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!
2. Amateur Radio

Don’t be an ass-hat on Amateur Radio.
2. 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
2. Amateur Radio

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
Higher Antenna Gain = Narrower Beamwidth
Classes of Operator

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

Classes of Operator

1. Technician
2. General
3. Extra
3. Getting Started

FluX Makes Things Simple

No Morse Code requirement
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
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
3. Getting Started

Call Sign Regions

[Map of the United States with regions marked]
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
3. Getting Started

Free Online Resources

- www.arrl.org/question-pools
- www.arrl.org/exam-practice
- www.qrz.com/exams
- www.eham.net/exams
### Questions Pool Size

<table>
<thead>
<tr>
<th></th>
<th>Questions Pool</th>
<th>Questions on exam</th>
<th>Passing grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>Technician</td>
<td>396</td>
<td>35</td>
<td>26</td>
</tr>
<tr>
<td>General</td>
<td>456</td>
<td>35</td>
<td>26</td>
</tr>
<tr>
<td>Extra</td>
<td>738</td>
<td>50</td>
<td>37</td>
</tr>
</tbody>
</table>

#### 3. Getting Started

Questions Pool Size
3. Getting Started

FluX Makes Things Simple

Cost of Exam: $15
3. Getting Started

Ass Kicked By A Blind Man
3. Getting Started

Ass Kicked By A Girl
4. Commercial To Amateur Hacks

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
Questions?
In the Q&A Room

matt@kgmn.net
2. Amateur Radio

A Series of Tubes