Digital Modes

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Digital Modes

- What is a “Digital Mode”?
- Examples
- Where can I find them?
- How do I use them?

What is a “Digital Mode”?

- CW was the first digital mode
- Frequency or Phase Shift Keying
- Encodes data as signals
- Decodes signals to text

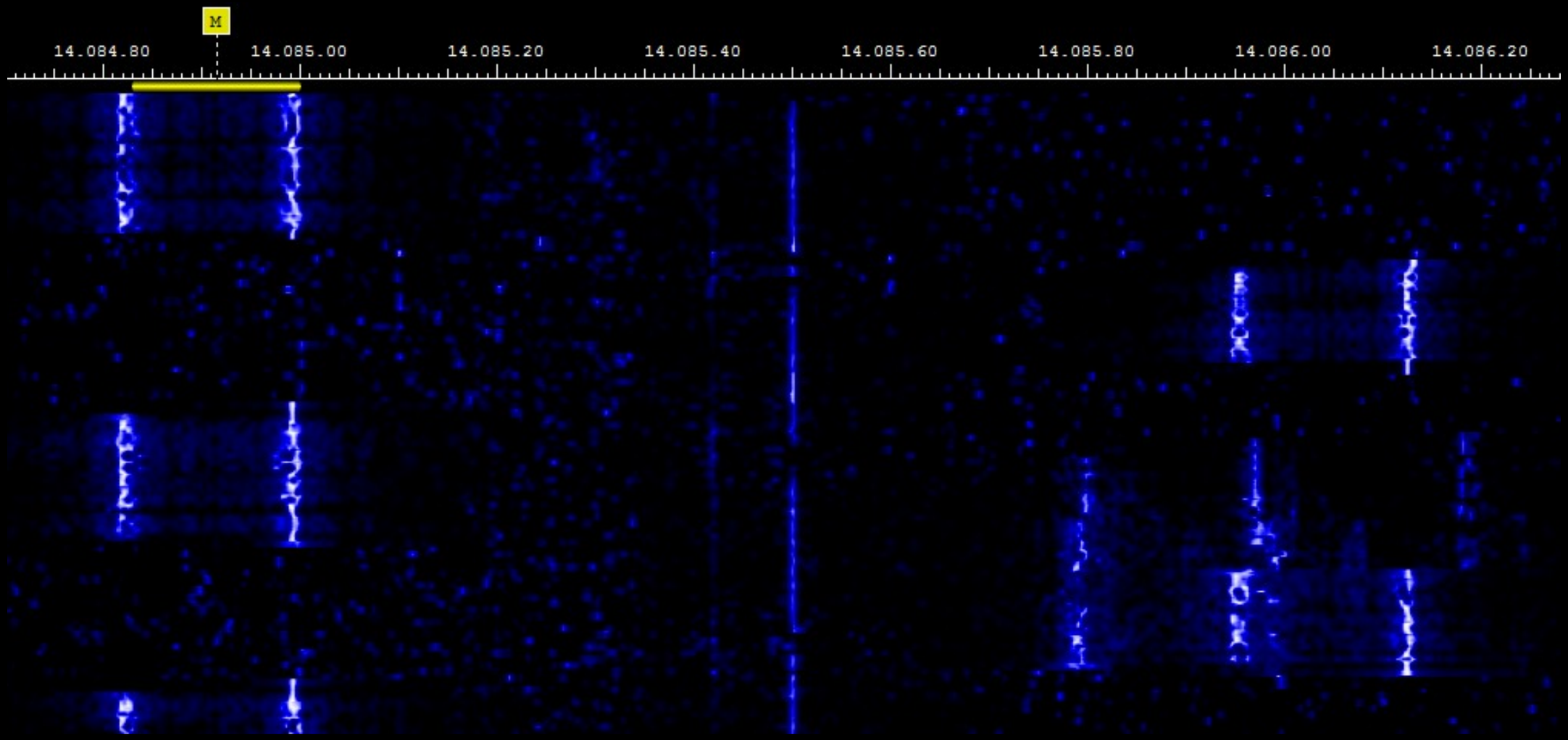
Popular Examples on HF

- RTTY
- PSK (31/63/125)
- JT65
- Olivia

RTTY

- RadioTeleTYpe
- FSK and AFSK
  - Frequency Shift Keying
- Based on Baldot coding
- Low spectral efficiency
- No error correction
- 170 Hz bandwidth

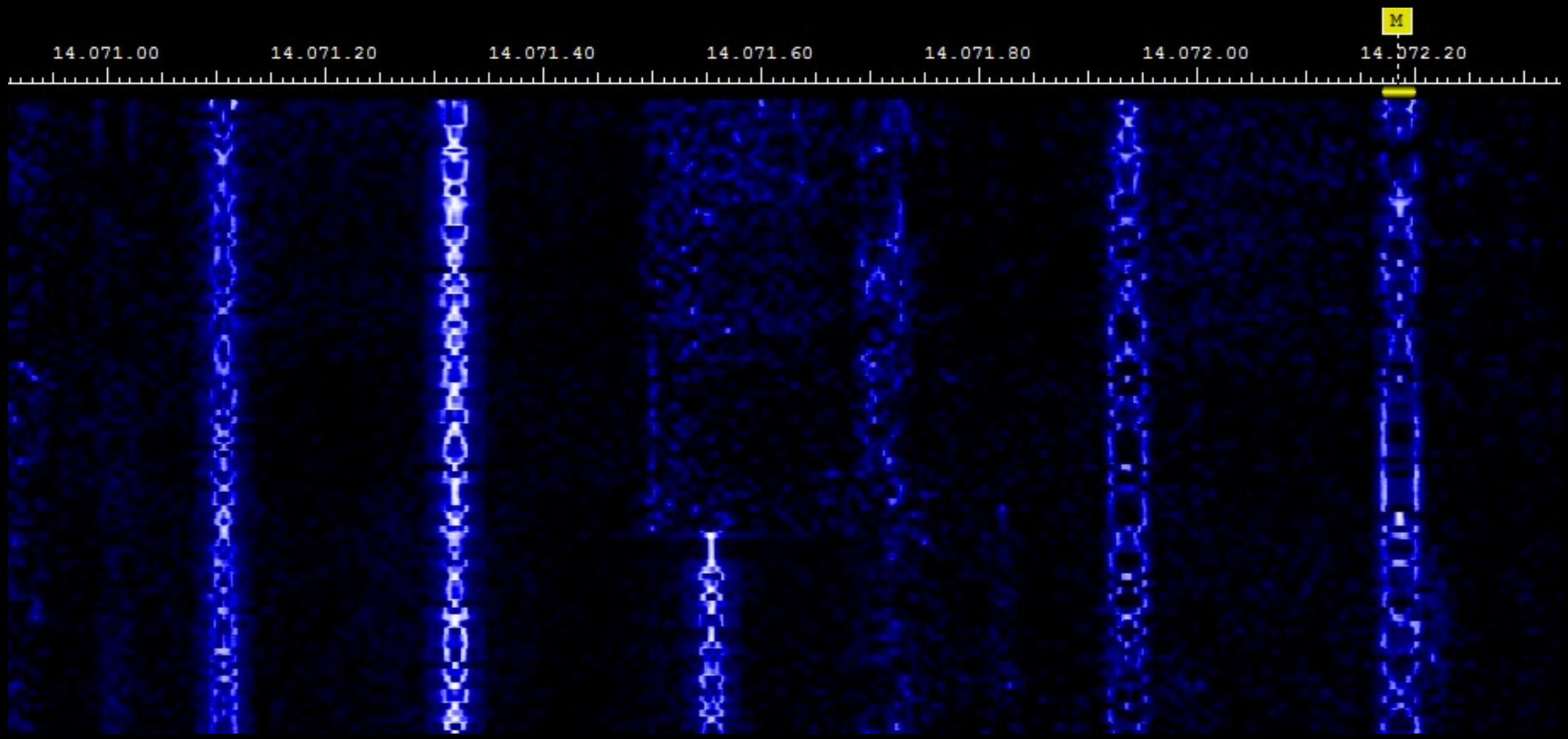
RTTY


M
14.084.80
14.085.00
14.085.20
14.085.40
14.085.60
14.085.80
14.086.00
14.086.20

PSK

- Phase Shift Keying
- Binary and Quadrature PSK
- Baud Rates
  - 31
  - 63
  - 125
- No error correction
- 30-130 Hz bandwidth

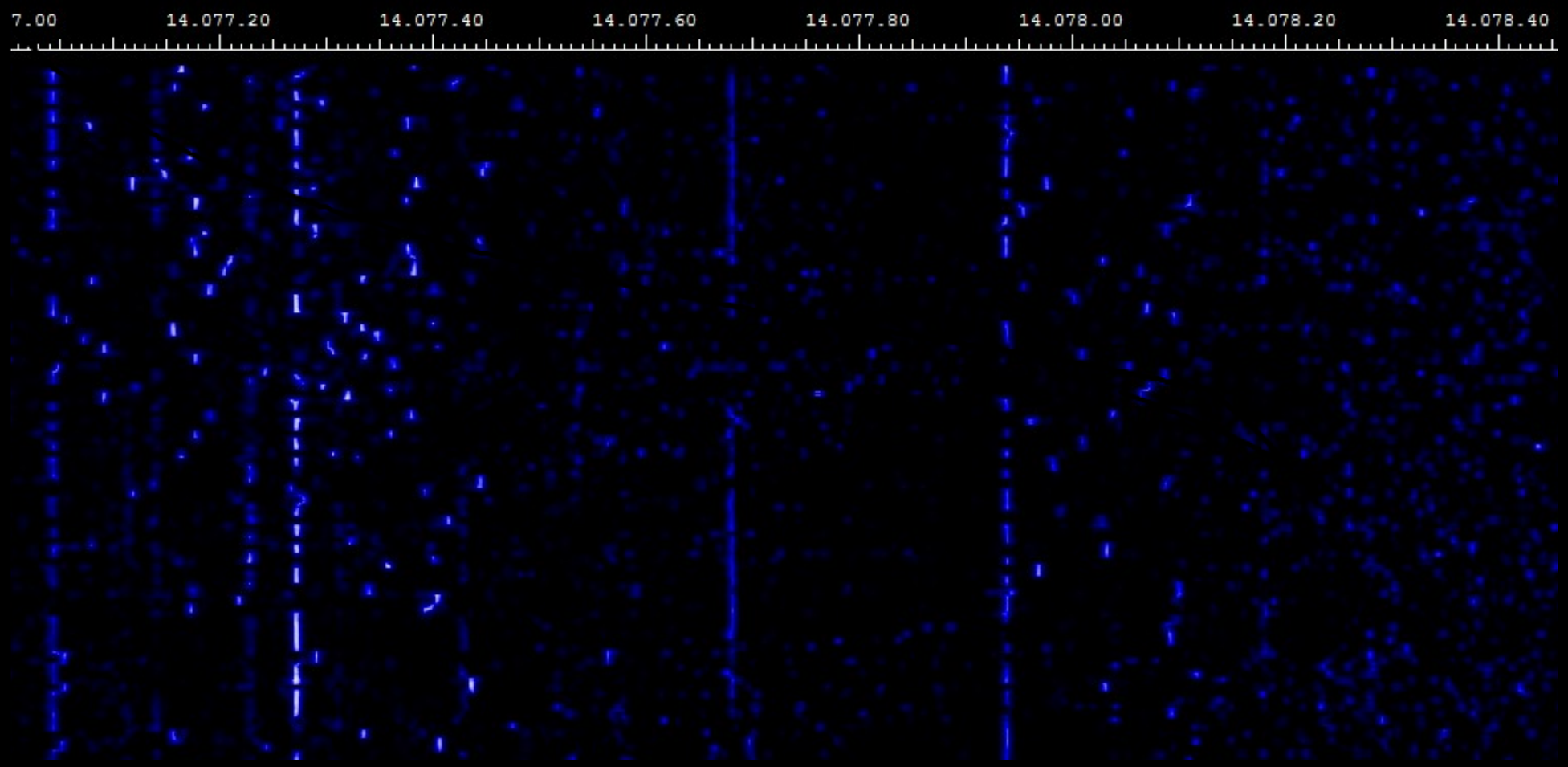
PSK


M
14.071.00
14.071.20
14.071.40
14.071.60
14.071.80
14.072.00
14.072.20

JT65

- Multiple Frequency Shift Keying (MFSK)
- Weak signal mode
- Intended for EME or Troposcatter
- Highly synchronized in minute intervals
- No error correction

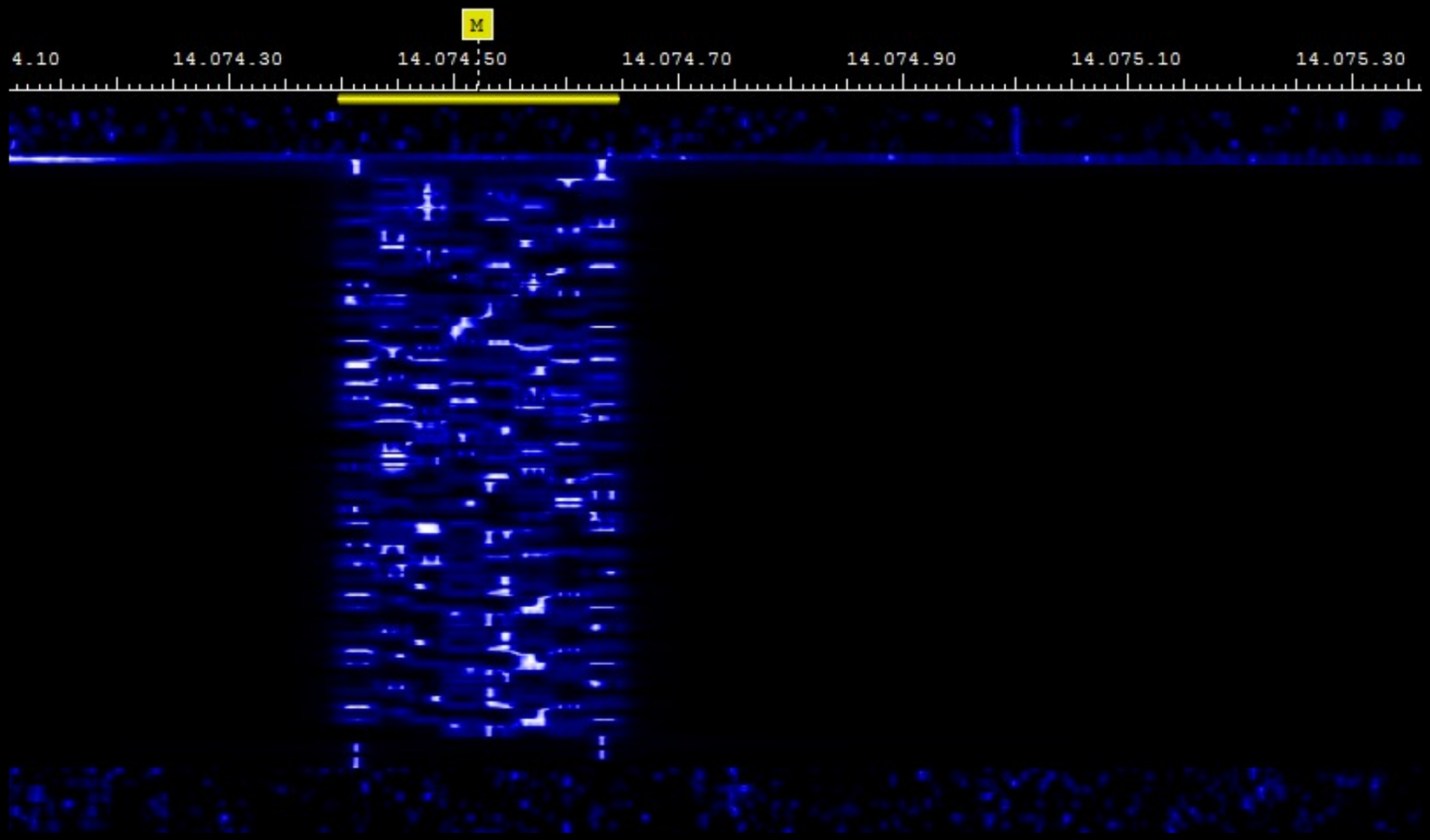
JT65


7.00
14.077.20
14.077.40
14.077.60
14.077.80
14.078.00
14.078.20
14.078.40

Olivia

- Multiple Frequency Shift Keying (MFSK)
- # of tones/bandwidth
  - ex Olivia 16/500 or 8/250
  - more tones == more redundancy
  - more tones == slower transmission
- Great in difficult conditions
  - 10-14dB below NF
- Error Correcting

Olivia 8/250



Other modes

- Pactor/Winlink
- Contestia
- Hellschreiber (Hell)
- Throb
- Domino
- Thor
- WSPR
- APRS

Where can I find them?

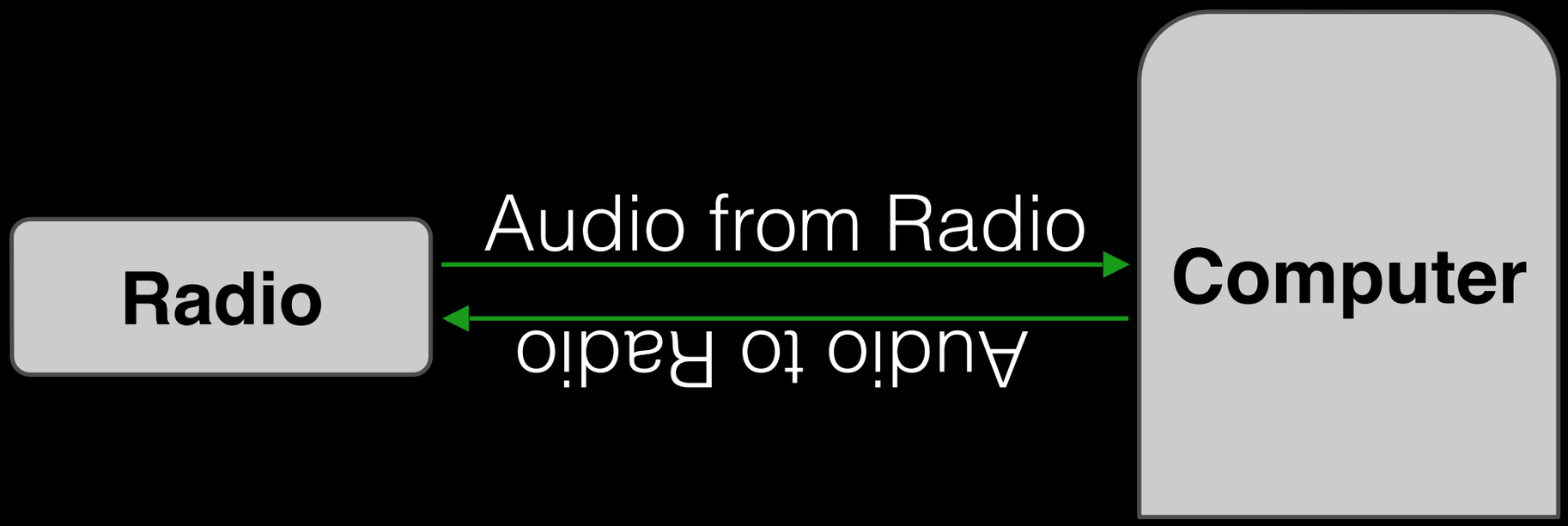
- Look at the ARRL band plans.
- Digital Modes fall in Data/RTTY space

Example for 3 bands			
Band	PSK	RTTY	JT65
10 m	28.070	28.070-28.150	28.076
15 m	21.070	21.070-21.100	21.076
20 m	14.070	14.070-14.095	14.076

How do I use them?

- You need:
- Radio
- Computer with sound card
- Digital Mode Software
- Optional:
- external soundcard or SignaLink

Basic Setup



Audio Out == Data Out

Audio In == Data In

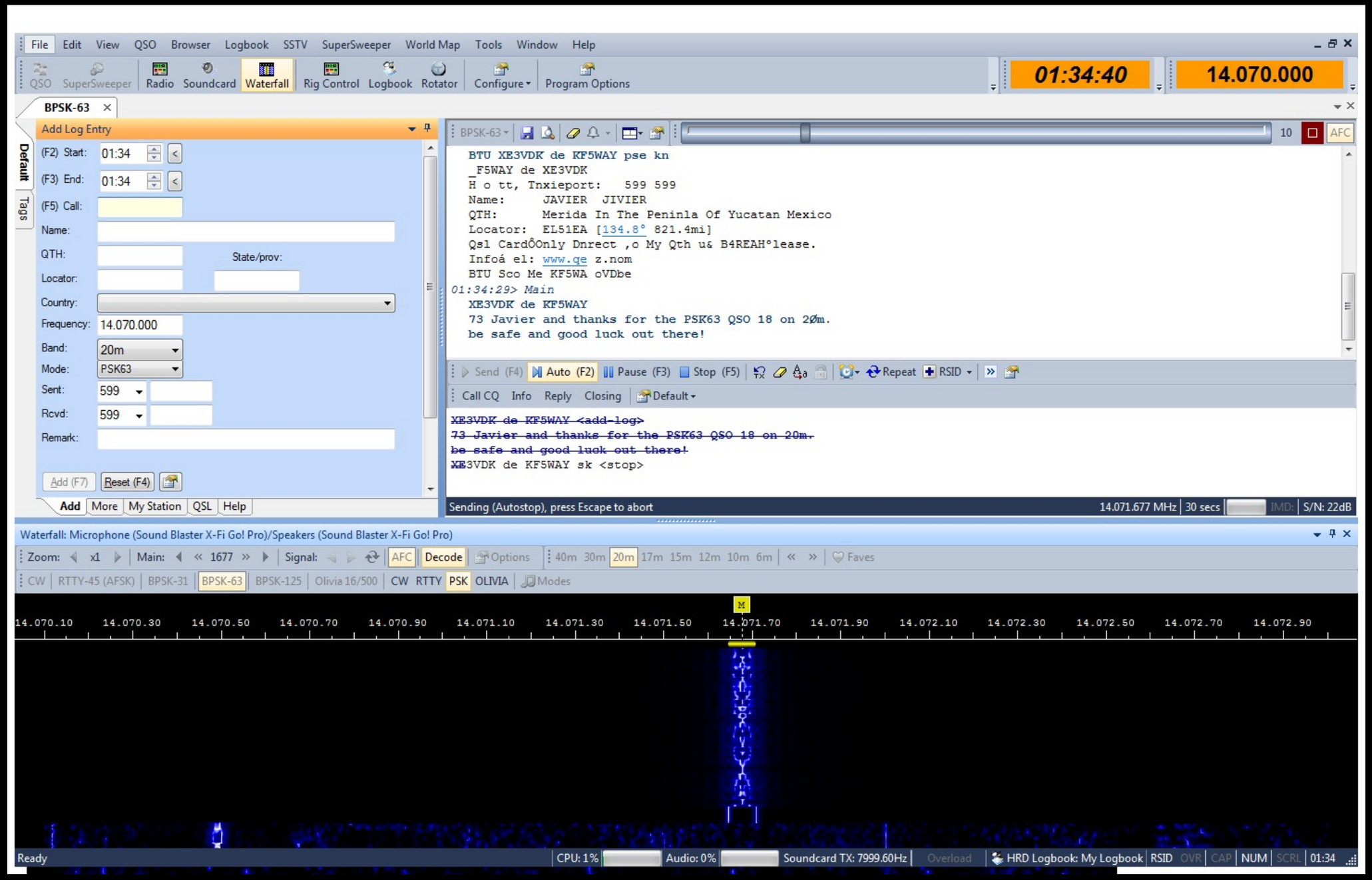
Software

- Ham Radio Deluxe
  - v6+ $99
  - v5 Free
- FLDigi
  - OpenSource aka Free
- DXLab
  - Freeware

Ham Radio Deluxe

- Ham radio software package includes:
  - Radio control app
  - Digital modes app
  - Logging app
  - Satellite tracking app
  - Rotator control app
  - http://www.ham-radio-deluxe.com/

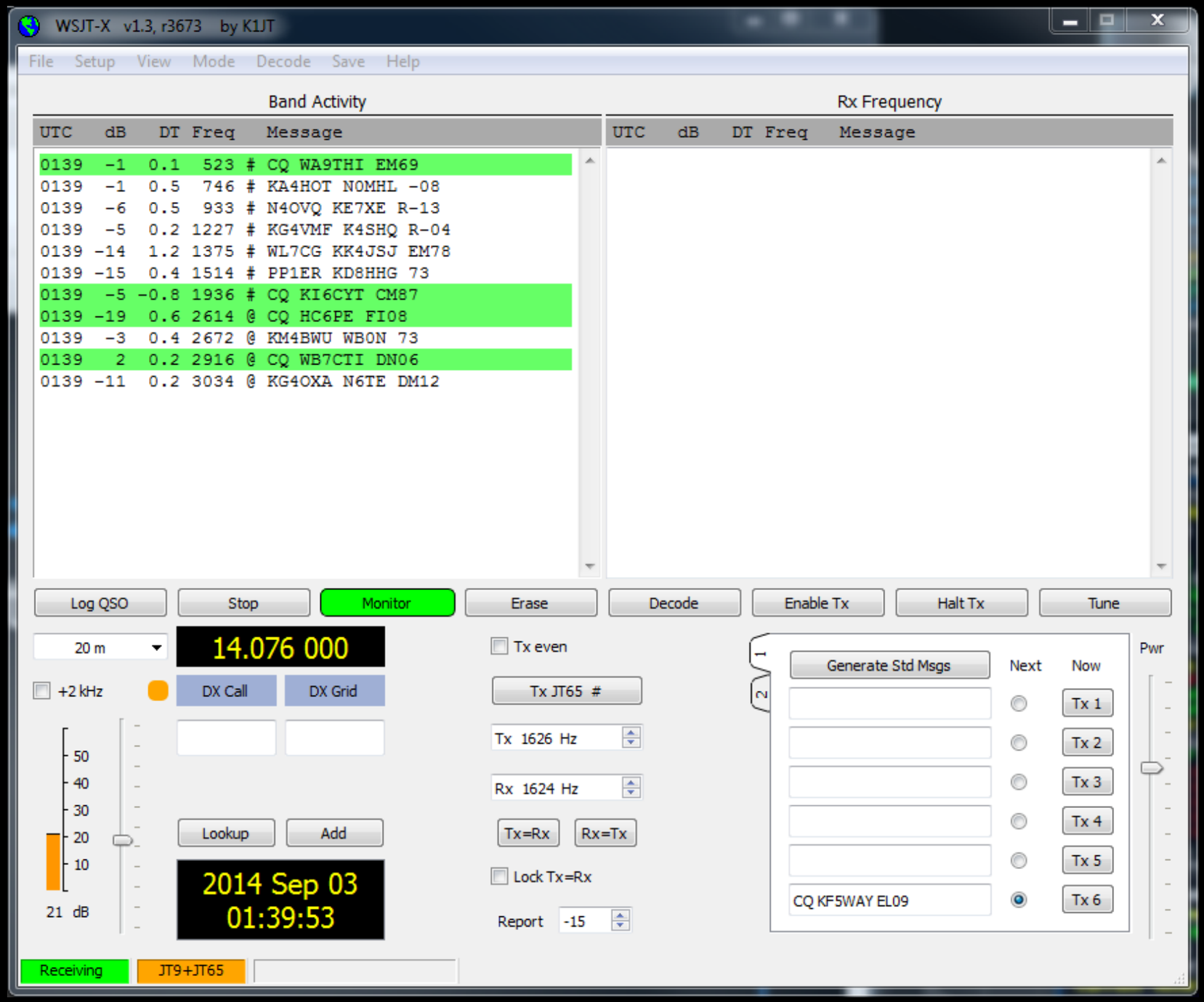
Ham Radio Deluxe



JT65 Software

- wsjtx
  - http://physics.princeton.edu/pulsar/K1JT/wsjtx.html
- JT65-HF
  - http://jt65-hf.sourceforge.net/

wsjtx


WSJT-X v1.3, r3673 by K1JT
File Setup View Mode Decode Save Help
Band Activity
UTC dB DT Freq Message
0139 -1 0.1 523 # CQ WA9THI EM69
0139 -1 0.5 746 # KA4HOT N0MHL -08
0139 -6 0.5 933 # N4OVQ KE7XE R-13
0139 -5 0.2 1227 # KG4VMF K4SHQ R-04
0139 -14 1.2 1375 # WL7CG KK4JSJ EM78
0139 -15 0.4 1514 # PP1ER KD8HHG 73
0139 -5 -0.8 1936 # CQ KI6CYT CM87
0139 -19 0.6 2614 @ CQ HC6PE FI08
0139 -3 0.4 2672 @ KM4BWU WB0N 73
0139 2 0.2 2916 @ CQ WB7CTI DN06
0139 -11 0.2 3034 @ KG4OXA N6TE DM12
Rx Frequency
UTC dB DT Freq Message
Log QSO
Stop
Monitor
Erase
Decode
Enable Tx
Halt Tx
Tune
20 m
14.076 000
Tx even
+2 kHz
DX Call
DX Grid
Tx JT65 #
Tx 1626 Hz
Rx 1624 Hz
50
40
30
20
10
21 dB
Lookup
Add
Tx=Rx
Rx=Tx
2014 Sep 03
01:39:53
Lock Tx=Rx
Report -15
Generate Std Msgs
Next
Now
Tx 1
Tx 2
Tx 3
Tx 4
Tx 5
Tx 6
CQ KF5WAY EL09
Pwr
Receiving
JT9+JT65

Useful Links

- Digital Modes, sound and pictures (http://hfradio.org.uk/html/digital_modes.html)
- ARRL Digital Modes (http://www.arrl.org/digital-modes)
- Digital Modes audio samples (http://www.kb9ukd.com/digital/)
- PSKReporter (http://pskreporter.info)

More Links

- FLDigi (http://www.w1hkj.com)
- DX Lab Suite (http://www.dxlabsuite.com)
- Tigertronics, SignaLink (http://www.tigertronics.com)