

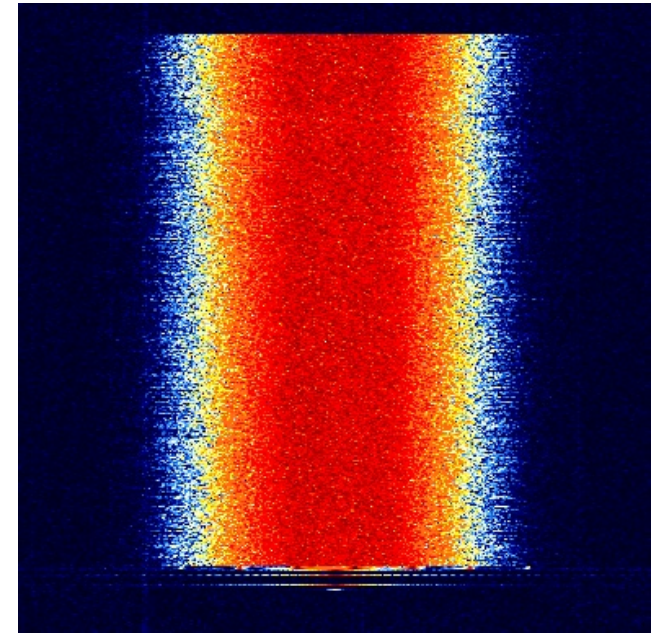


# M17 Project – GNU Radio implementation

Wojciech Kaczmarek, *M17 Project, DARC*

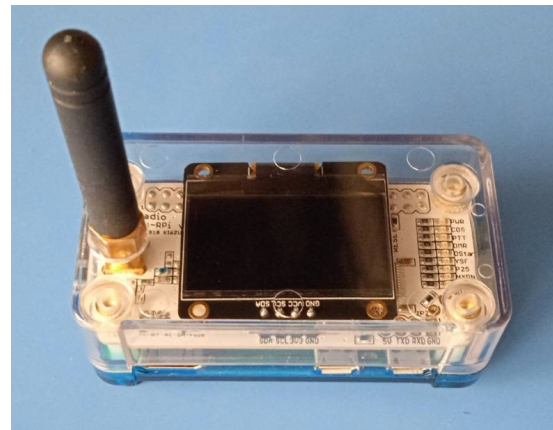
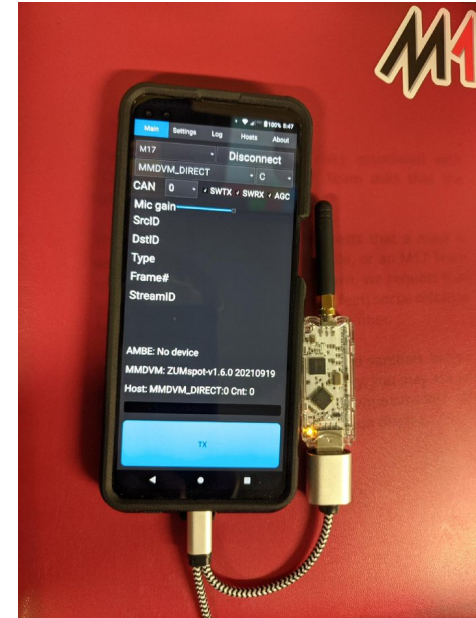
# M17 Project in a nutshell

- Digital radio modulation mode
- 4FSK, 9600 bps
- RRC filtered,  $\alpha=0.5$
- Stream and packet modes
- Spec is released under GPL-2.0



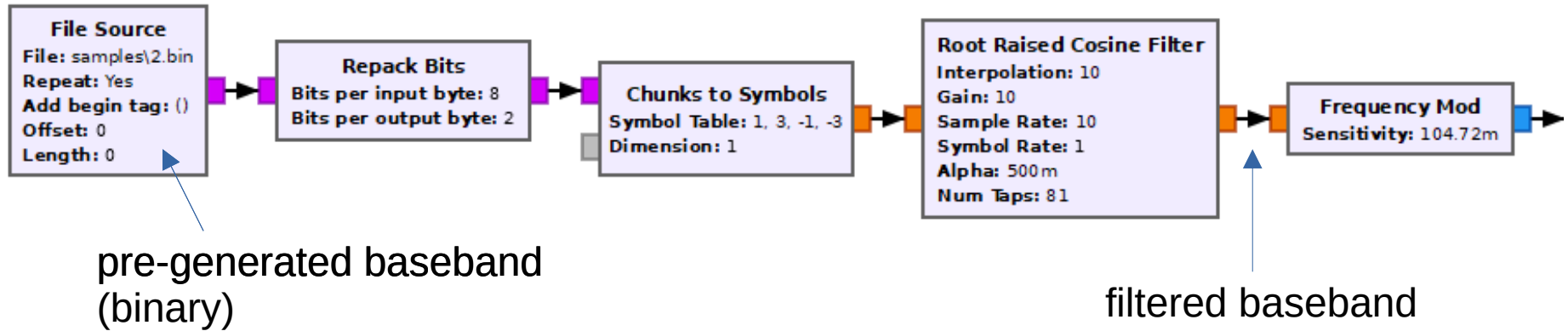
← 9 kHz →

# M17 Project in a nutshell



AMATEUR RADIO DIGITAL COMMUNICATIONS

# Basic M17 TX setup

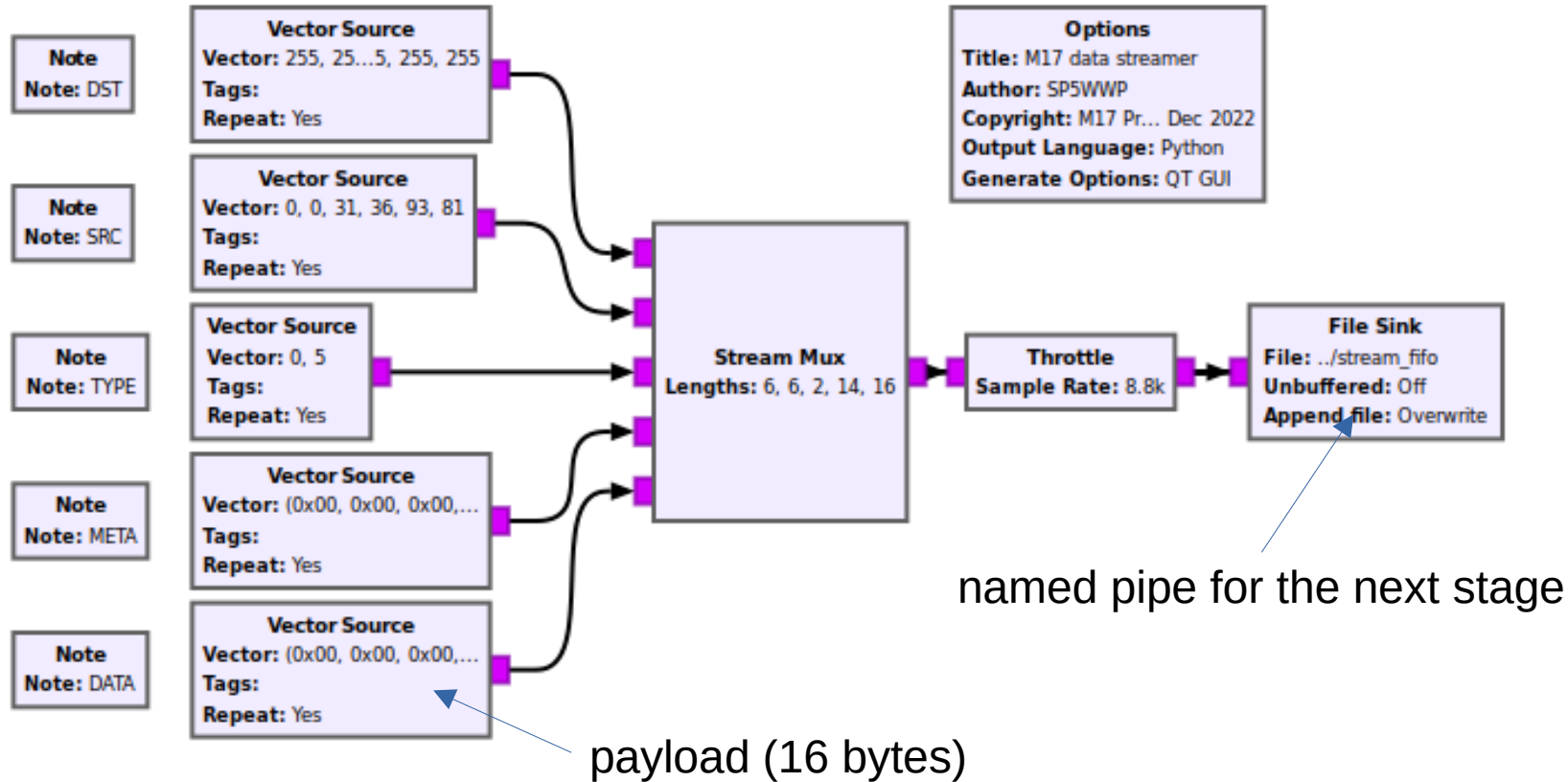


# Reference C implementation

Open source, available on GitHub (GPL-2.0)



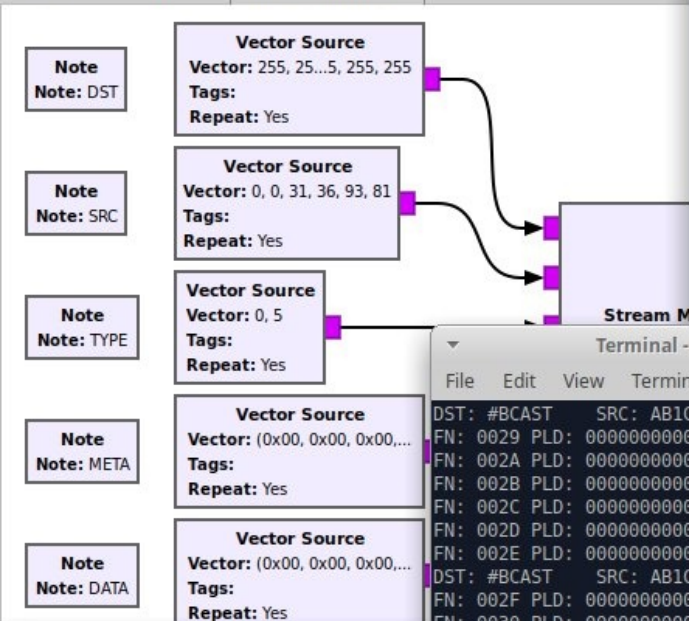
# Early days





m17\_streamer.g...  
 File Edit View Run Tools Help  
 symbol\_recovery x m17\_streamer x

Terminal - sp5wvp@sp5wvp:~/Desktop/prog/m17-implementation/m17-coder  
 File Edit View Terminal Tabs Help  
 sp5wvp@sp5wvp:~/Desktop/prog/m17-implementation/m17-coder\$ cat ../../../../stream\_f  
 ifo | ./m17-coder-sym > ../../../../symb fifo  
 sp5wvp@sp5wvp:~/Desktop/prog/m17-implementation/m17-coder\$



Terminal - sp5wvp@sp5wvp:~/Desktop/prog/m17-implementation/m17-decoder  
 File Edit View Terminal Tabs Help

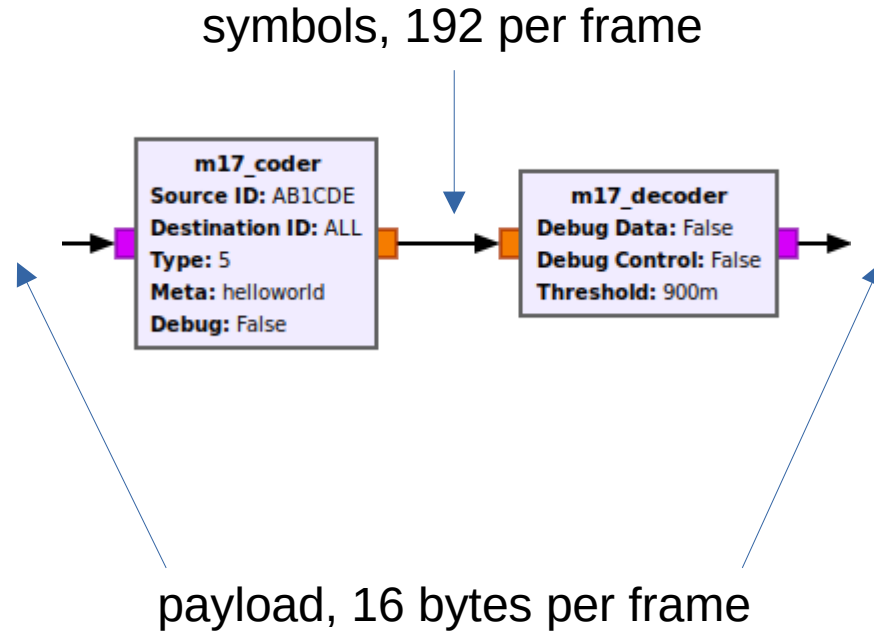
```

DST: #BCAST SRC: AB1CDE TYPE: 0005 META: 00000000000000000000000000000000 LSF_CRC_OK
FN: 0029 PLD: 0000000000000000000000000000000000000000000000000000000000000000
FN: 002A PLD: 0000000000000000000000000000000000000000000000000000000000000000
FN: 002B PLD: 0000000000000000000000000000000000000000000000000000000000000000
FN: 002C PLD: 0000000000000000000000000000000000000000000000000000000000000000
FN: 002D PLD: 0000000000000000000000000000000000000000000000000000000000000000
FN: 002E PLD: 0000000000000000000000000000000000000000000000000000000000000000
DST: #BCAST SRC: AB1CDE TYPE: 0005 META: 00000000000000000000000000000000 LSF_CRC_OK
FN: 002F PLD: 0000000000000000000000000000000000000000000000000000000000000000
FN: 0030 PLD: 0000000000000000000000000000000000000000000000000000000000000000
FN: 0031 PLD: 0000000000000000000000000000000000000000000000000000000000000000
FN: 0032 PLD: 0000000000000000000000000000000000000000000000000000000000000000
FN: 0033 PLD: 0000000000000000000000000000000000000000000000000000000000000000
FN: 0034 PLD: 0000000000000000000000000000000000000000000000000000000000000000
DST: #BCAST SRC: AB1CDE TYPE: 0005 META: 00000000000000000000000000000000 LSF_CRC_OK
FN: 0035 PLD: 0000000000000000000000000000000000000000000000000000000000000000
FN: 0036 PLD: 0000000000000000000000000000000000000000000000000000000000000000
FN: 0037 PLD: 0000000000000000000000000000000000000000000000000000000000000000
FN: 0038 PLD: 0000000000000000000000000000000000000000000000000000000000000000
FN: 0039 PLD: 0000000000000000000000000000000000000000000000000000000000000000
FN: 003A PLD: 0000000000000000000000000000000000000000000000000000000000000000
DST: #BCAST SRC: AB1CDE TYPE: 0005 META: 00000000000000000000000000000000 LSF_CRC_OK
FN: 003B PLD: 0000000000000000000000000000000000000000000000000000000000000000
  
```

M17 data streamer

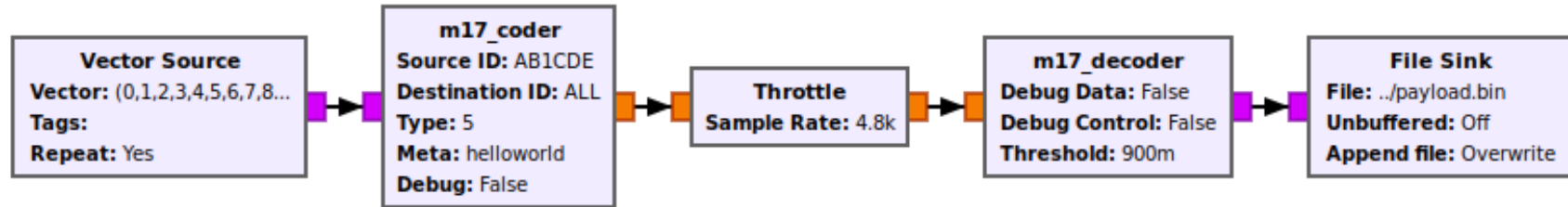
# M17 OOT blocks

- gr-m17





# M17 OOT blocks – loopback



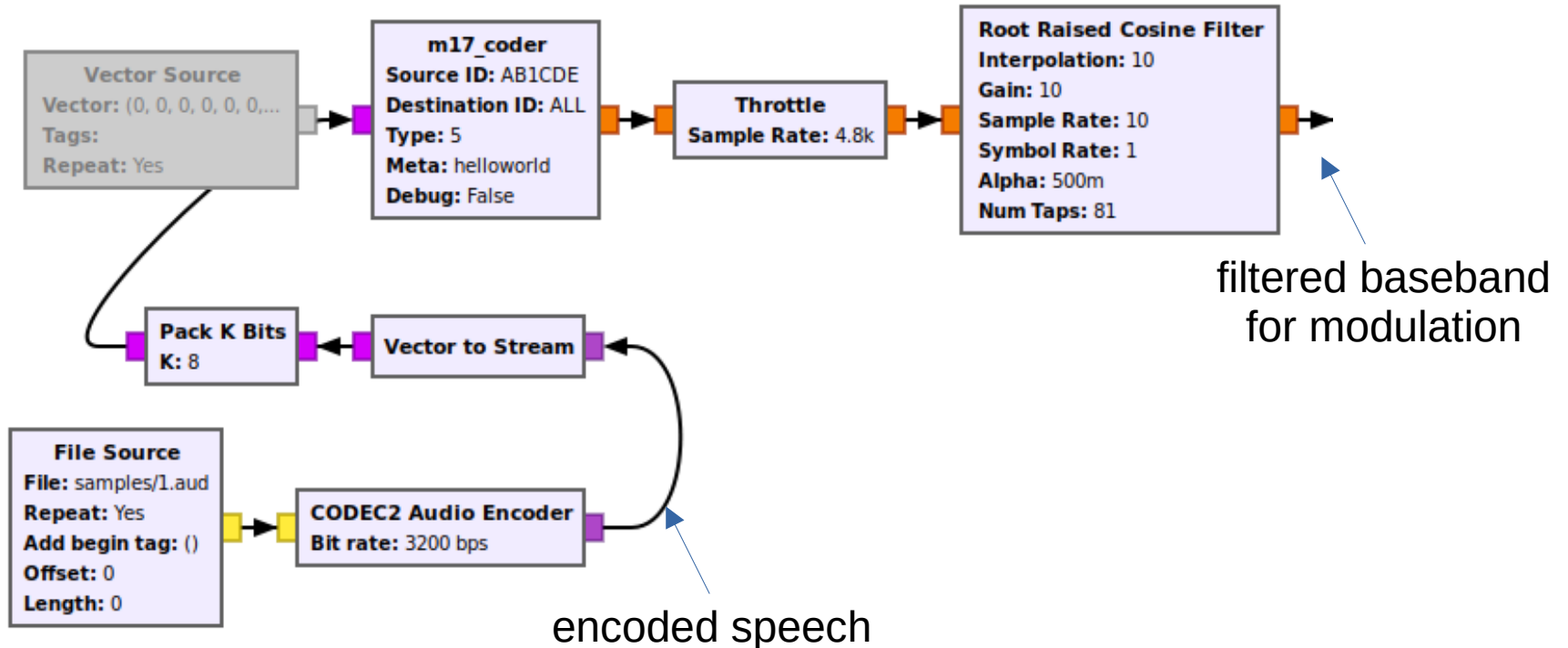
# M17 OOT blocks – loopback

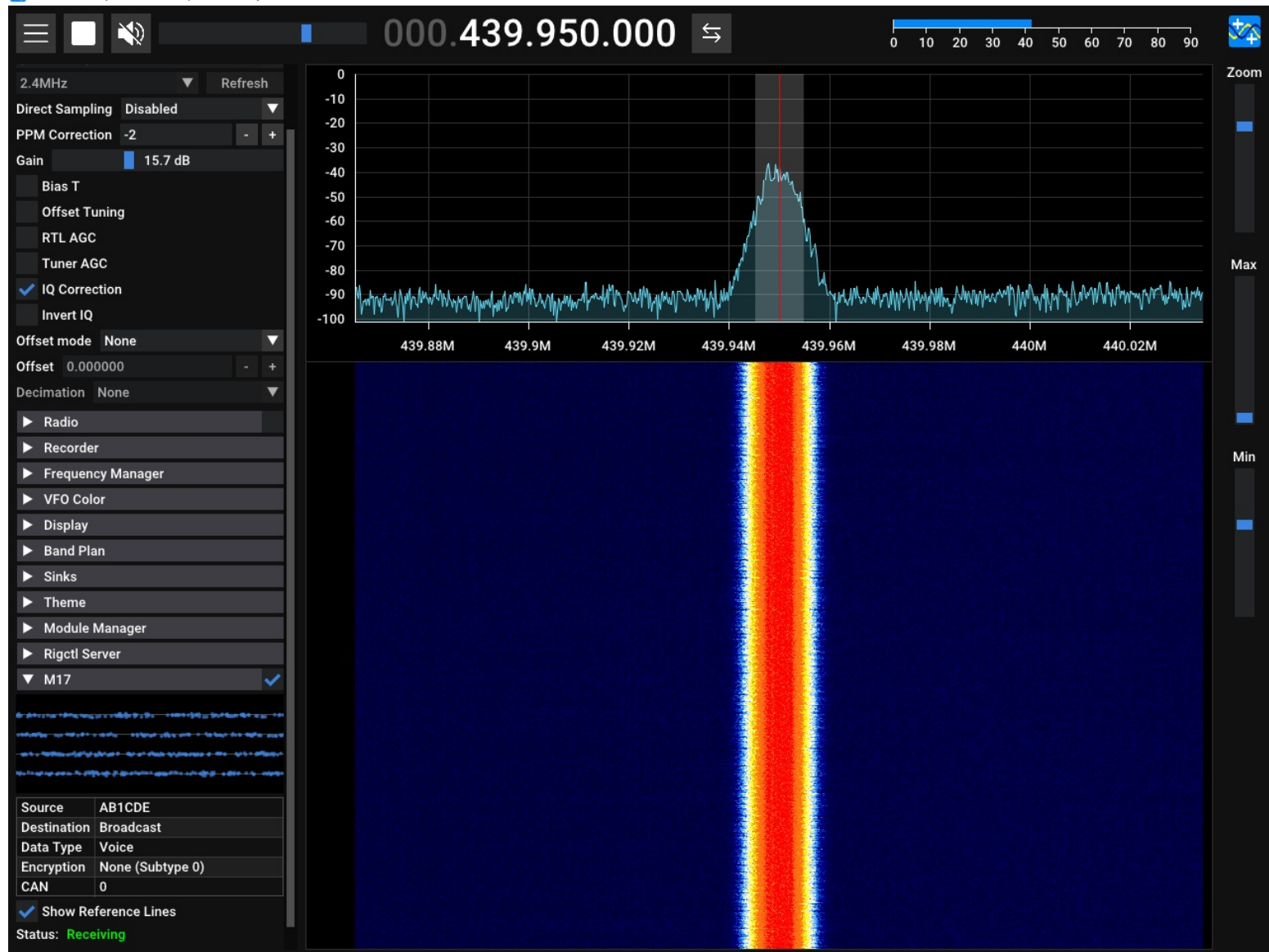
```
0000:0000 00 01 02 03 04 05 06 07 08 09 0A 0B 0C 0D 0E 0F
0000:0010 00 01 02 03 04 05 06 07 08 09 0A 0B 0C 0D 0E 0F
0000:0020 00 01 02 03 04 05 06 07 08 09 0A 0B 0C 0D 0E 0F
0000:0030 00 01 02 03 04 05 06 07 08 09 0A 0B 0C 0D 0E 0F
0000:0040 00 01 02 03 04 05 06 07 08 09 0A 0B 0C 0D 0E 0F
0000:0050 00 01 02 03 04 05 06 07 08 09 0A 0B 0C 0D 0E 0F
0000:0060 00 01 02 03 04 05 06 07 08 09 0A 0B 0C 0D 0E 0F
0000:0070 00 01 02 03 04 05 06 07 08 09 0A 0B 0C 0D 0E 0F
0000:0080 00 01 02 03 04 05 06 07 08 09 0A 0B 0C 0D 0E 0F
0000:0090 00 01 02 03 04 05 06 07 08 09 0A 0B 0C 0D 0E 0F
0000:00A0 00 01 02 03 04 05 06 07 08 09 0A 0B 0C 0D 0E 0F
0000:00B0 00 01 02 03 04 05 06 07 08 09 0A 0B 0C 0D 0E 0F
0000:00C0 00 01 02 03 04 05 06 07 08 09 0A 0B 0C 0D 0E 0F
0000:00D0 00 01 02 03 04 05 06 07 08 09 0A 0B 0C 0D 0E 0F
0000:00E0 00 01 02 03 04 05 06 07 08 09 0A 0B 0C 0D 0E 0F
0000:00F0 00 01 02 03 04 05 06 07 08 09 0A 0B 0C 0D 0E 0F
0000:0100 00 01 02 03 04 05 06 07 08 09 0A 0B 0C 0D 0E 0F
0000:0110 00 01 02 03 04 05 06 07 08 09 0A 0B 0C 0D 0E 0F
0000:0120 00 01 02 03 04 05 06 07 08 09 0A 0B 0C 0D 0E 0F
0000:0130 00 01 02 03 04 05 06 07 08 09 0A 0B 0C 0D 0E 0F
0000:0140 00 01 02 03 04 05 06 07 08 09 0A 0B 0C 0D 0E 0F
0000:0150 00 01 02 03 04 05 06 07 08 09 0A 0B 0C 0D 0E 0F
0000:0160 00 01 02 03 04 05 06 07 08 09 0A 0B 0C 0D 0E 0F
0000:0170 00 01 02 03 04 05 06 07 08 09 0A 0B 0C 0D 0E 0F
```



# M17 OOT blocks – TX

- Encoded speech





# Issues to address

- m17\_coder skipping frames
- m17\_decoder doesn't allow for late-entries