



OOK48 WEAK SIGNAL MODE

DAVE, G8GKQ

SCOPE

- OOK 48 – The user requirement
- Development
- Technical Details
- Hardware
- Demonstration



OOK48 – THE USER REQUIREMENT

- Higher power levels can be achieved on the mm-wave bands by using CW rather than SSB/data
- A number of microwave operators are CW-challenged
- Opera is one solution, but is clumsy
- The requirement is for something like machine-readable CW (on-off keying)
- Preferably instant feedback and Portable-friendly

OOK48 – DEVELOPMENT

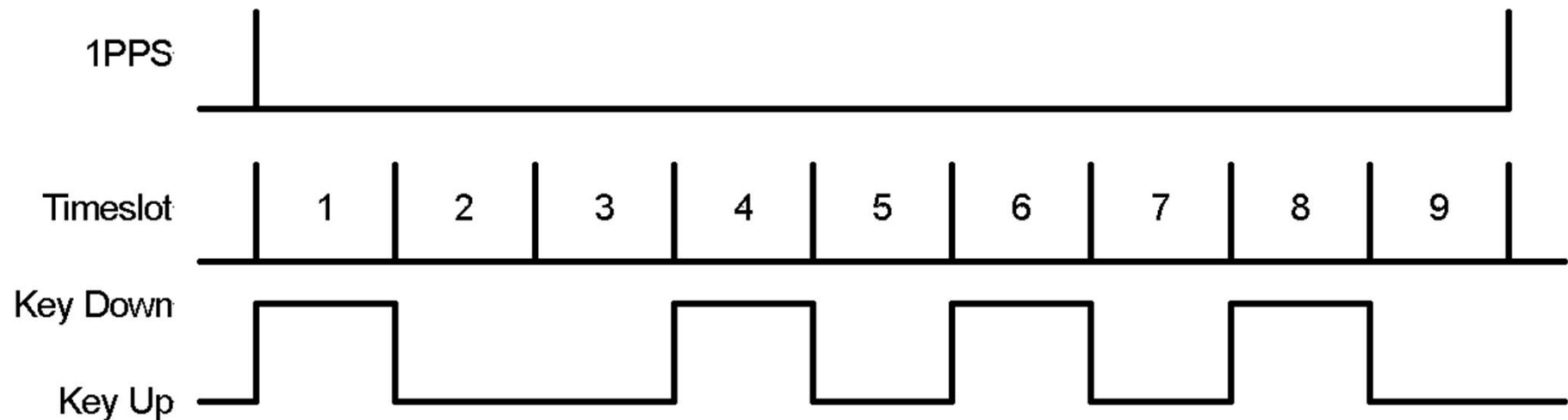
- Huddle at the Martlesham Round Table defined the requirement
- Andy G4JNT had previously published ideas in RadCom
- Colin G4EML offered to try to implement something
- Iterative development since then
- Stable solution now available

OOK48 – TECHNICAL DETAILS

- The difficulty in CW decoding is deriving timing
- OOK48 is GPS locked; each character starts on the second
- 8 bits (on or off) are sent. Valid codes have 4 on and 4 off
- To decode, highest 4 are on, lowest 4 are off
- No error correction
- Best Guess displayed - one character per second

OOK48 – TECHNICAL DETAILS

- 9 time slots of 111 ms each second



Example encoding for the letter G.
4 from 8 value = 10010101

OOK48 – TECHNICAL DETAILS



- It sounds a lot like CW
- It achieves 60 characters/min (12 wpm)
- Message is repeated to allow human error correction
- Receiver optimised for 800 Hz

OOK48 – SENSITIVITY

- Effectively a 9 Hz bandwidth
- BUT – because of demod method works well with RS/aurora
- Variable bandwidth receiver
- Is it better than CW? – It depends!
 - For me, yes. For noisy and many portable environments, yes.
 - For an experienced CW operator in his shack, probably not.

OOK48 – HARDWARE

- Based on an RP2040 Microcontroller with a touchscreen
- Elecrow CrowPanel Pico 3.5
- The unit is available from AliExpress for about £20

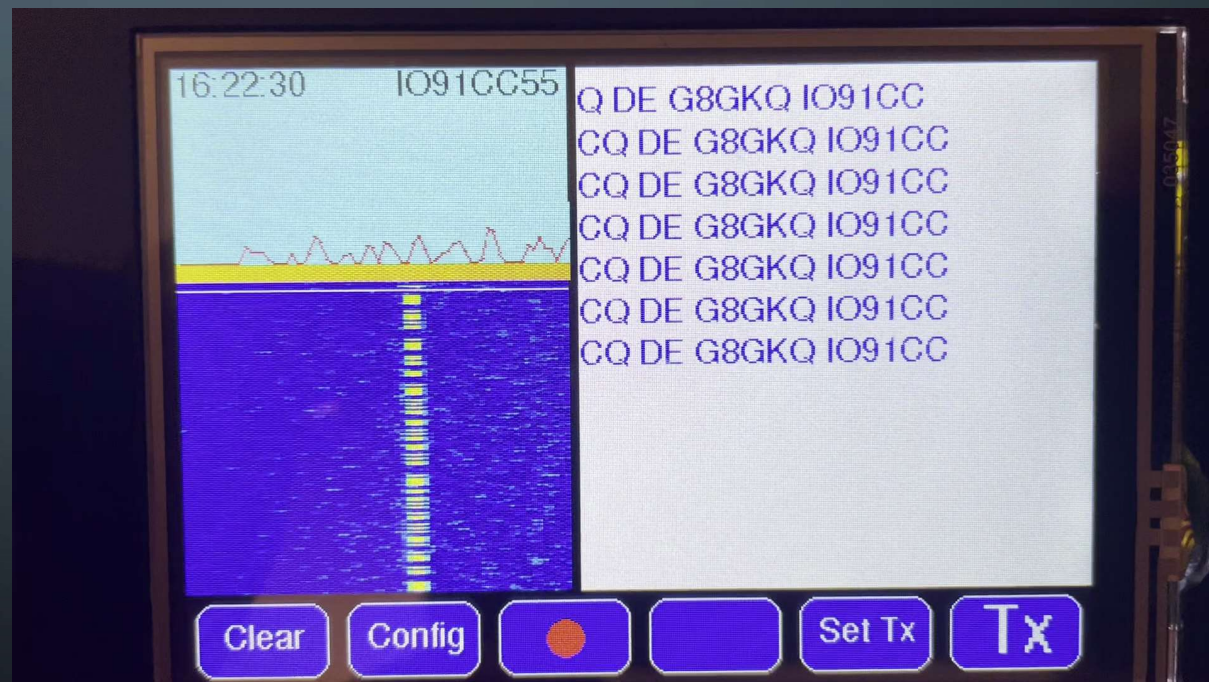


HARDWARE



VIDEO DEMONSTRATION

- <File:///F:/My Documents/Radio/BATC/Presentations/20251122 Midland MRT/Receiving.MOV>



HARDWARE FEATURES (1)

- Stand alone Device with LCD touch screen display.
- No special programming hardware or software required.
- Programming using the RP2040's built in standard boot loader.
- 10 Preset Messages are saved to EEPROM for automatic load on power on.
- Optional 2 Seconds per character mode which increases the decode sensitivity slightly.

HARDWARE FEATURES (2)

- Automatic calculation of QTH Locator. Selectable for 6, 8 or 10 character accuracy. This locator can be inserted in any of the 10 Preset Messages.
- Recording of messages to SD card for later viewing on a PC.
- USB Drive mode to allow downloading of SD card files to a PC.
- Includes decode only mode for JT4G and P14 beacon signals.
- Battery monitor

SET TX MENU

CQ DE G8GKQ/P {LOC}

M0EYT/P DE G8GKQ/P ...

G7MHF 455

EMPTY

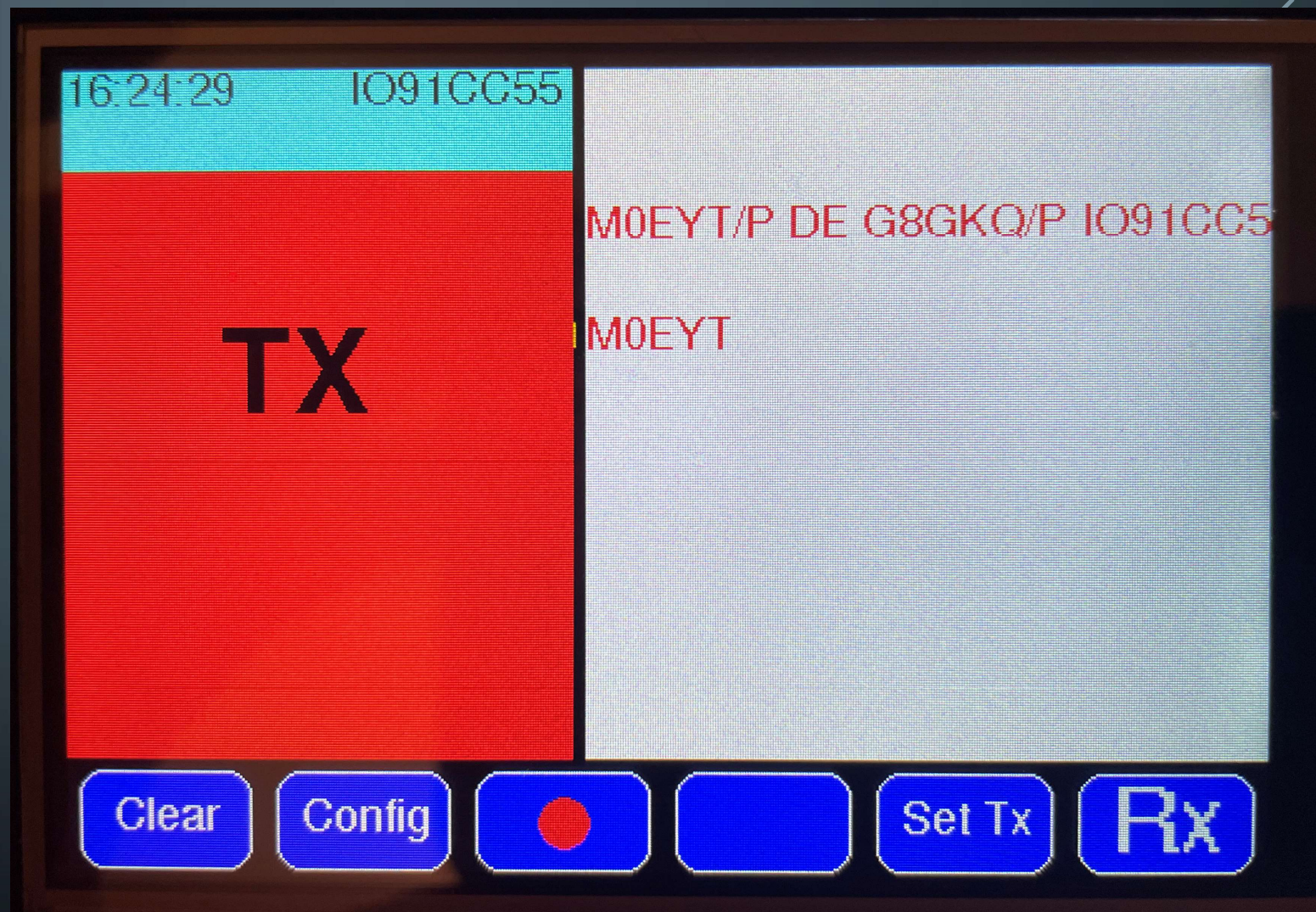
EMPTY

EMPTY

EMPTY

EMPTY

TX SCREEN



CONFIG

Set Locator length

6

8

10

Character Period

1s

2s

GPS Baud Rate

9600

38400

Decode Mode

Norm

Alt

Tx Timing Advance

0

ms

Rx Timing Retard

0

ms

Activate USB Drive Mode

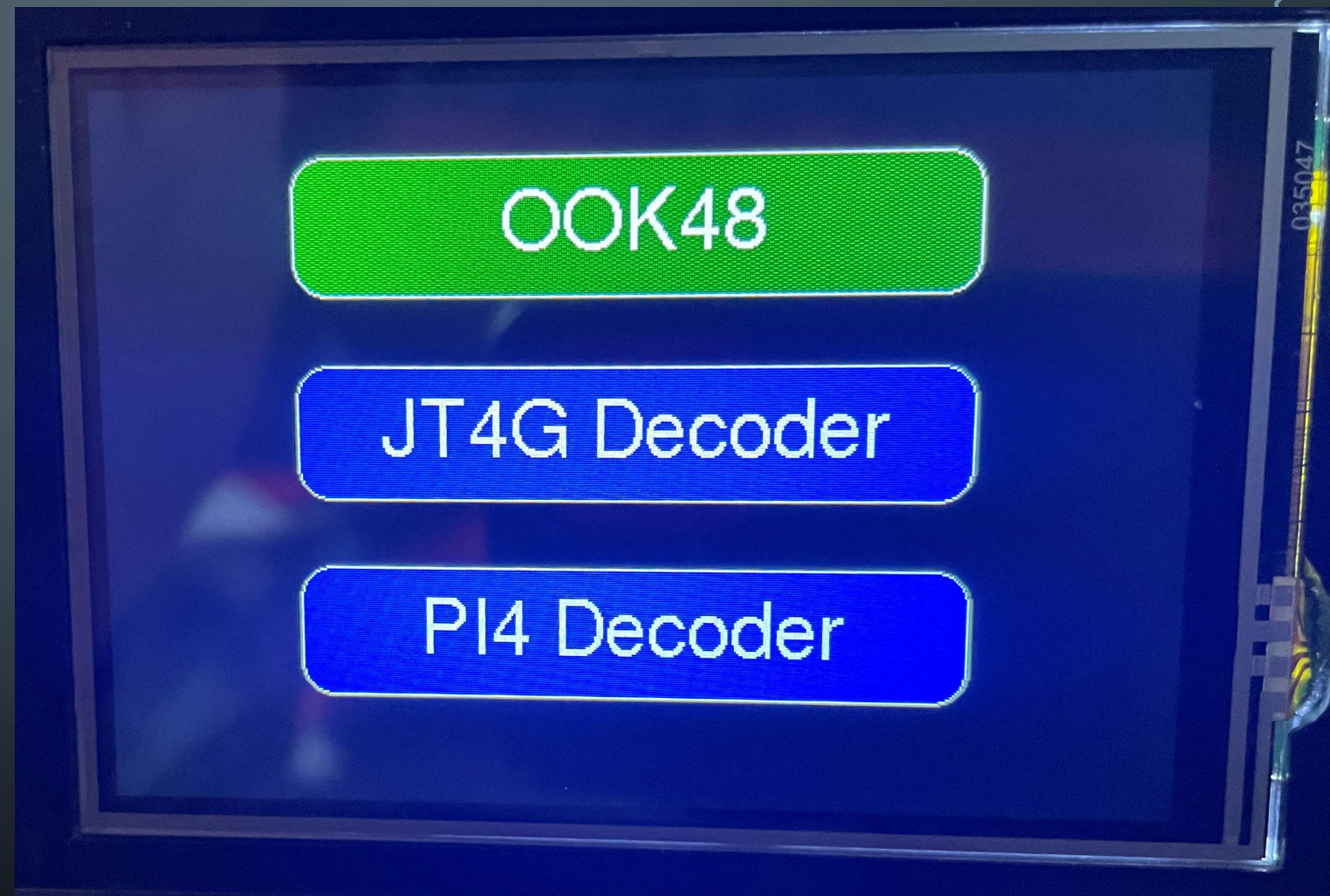
USB

Version 0.11

3.59 V

EXIT

APP



HARDWARE COST

- £16.99 Elecrow 3.5" Display
- £7.86 GPS Module
- £0.56 Speaker
- £4.50 18650 Battery
- £0.47 Battery Holder
- £0.56 Amplifier
- £0.92 Speaker
- £0.57 Battery Monitor
- £4.00 G4EML Int Board & leads
- £0.71 Phono Sockets (3)
- £??.?? Case and Sun Shade
- £37.14 + Case

ACKNOWLEDGEMENTS

- The mm-wave microwave community for driving the idea
- Andy G4JNT for technical advice
- Rob G7MHF for early kits
- Colin G4EML for almost everything else
 - Hardware implementation
 - User-friendly software
 - Documentation

REFERENCES

- G4JNT Data Column RadCom October 2024 page 32
- All OOK48 info: https://github.com/g4eml/RP2040_OOK48_LCD
- Panel: <https://www.aliexpress.com/item/1005007250778536.html>
- Protocol: https://github.com/g4eml/RP2040_OOK48_LCD/blob/main/Documents/OOK48%20Protocol.pdf

A decorative graphic on the left side of the slide, consisting of a network of thin, light blue lines and small circles, resembling a circuit board or a neural network diagram. The lines are vertical and horizontal, with some diagonal connections, and the circles are placed at various points along these lines.

LIVE DEMO

QUESTIONS