The Ultimate Morse Sender Programs

There are two versions of the ZS6BVR Morse programs

1. One for use as the ultimate Morse Trainer program (which I wrote in Java)
2. The Other as a Morse sender to use with your CW rig to transmit Morse on the HF (Which I wrote in MicroPython)

If you are reading this **please download the latest PDF version of this document** which is updated regularly and has all the chapters here :
https://github.com/nic0michael/MorseSender/blob/master/TheUltimateMorseSenderProgram.pdf

73 de Nico
ZS6BVR

1. Introduction to Morse Code Today

Morse code is still widely used by amateur radio operators for long-distance and low-power communication.
It can be copied by ear even in noisy or weak-signal conditions where digital modes fail.
Emergency services and hobbyists value Morse as a reliable backup communication method.
Practicing Morse also trains memory, focus, and pattern recognition skills useful in many field
Working DX during periods of **Low Sunspot Count** like now can be done with CW when SSB is dead
Working QRP can be done with CW even **below 1W power**

2. ZS6BVR_MorseCodeSenderPiPico

The purpose of the project is to Key your HF Rig and send Morse from your keyboard by operating a read relay to key your CW Transmitter

Phase 2 of this project is to read Morse Code giving you a CW Transciever program.

Features:

This program gives you 9 memories to save and send things like “CQ CQ DX DE ZS6BVR”

It also has commands :

a. @ will send continuous dots (scope calibration)
b. # will send continuous tone (frequency counter calibration)
c. [text] Repeat text 3 times with pauses
d. #H Show this help message
e. + /- You can increase or decrease the speed

This is written in Python and runs on the smallest Arduino replacement
the Raspberry Pi Pico 2W

My Raspberry Pi Pico 2W running this program

The program running from my laptop:

Thonny - Raspberry Pi Pico :: /zs6bvr-morse-senderV2.py @ 194 : 1

File Edit View Run Tools Help

<untitled> [zs6bvr-morse-senderV2.py]

```
1  # ZS6BVR Morse Sender (Raspberry Pi Pico W) V2.1
2  from machine import Pin
3  import time, random
4
5  # ------------------------------
6  # Version and Calibration
7  # ------------------------------
8  VERSION = "2.1"
9  CALIBRATION = 1.0  # Adjust to correct timing, e.g., 0.997 or 1.0045
10
11 # ------------------------------
12 # Pins
13 # ------------------------------
14 relay_pin = Pin(1, Pin.OUT)          # Relay on GP1
15 led_pin = Pin("LED", Pin.OUT)        # Onboard LED
16 red_led_pin = Pin(4, Pin.OUT)        # RED LED on GP4 (Morse output)
17 green_led_pin = Pin(5, Pin.OUT)      # GREEN LED on GP5 (future use)
```

Shell

```
>>> %Run -c $EDITOR_CONTENT

  ZS6BVR Morse Sender (Raspberry Pi Pico W) Version 2.1
  Type message and press ENTER
  Type #H for help

  [12 WPM] > CQ de ZS6BVR
  Sending: CQ de ZS6BVR
  [12 WPM] >
```

MicroPython (Raspberry Pi Pico)

Here I did a test sending this message :

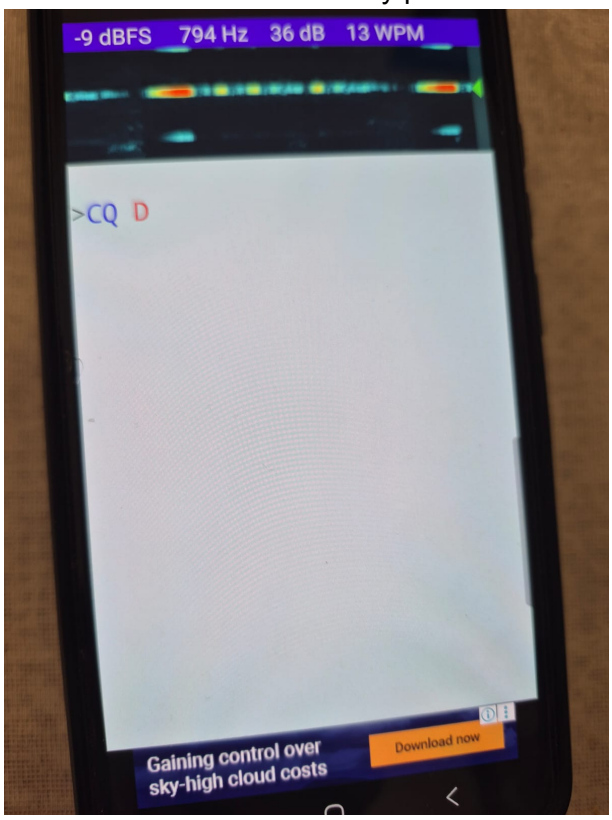
za.co.morse.morsesender.MorseSender › scopeMode › try › while (true) › if (System.in.available() > 0) ›

Output - **Run (MorseSender)** ×

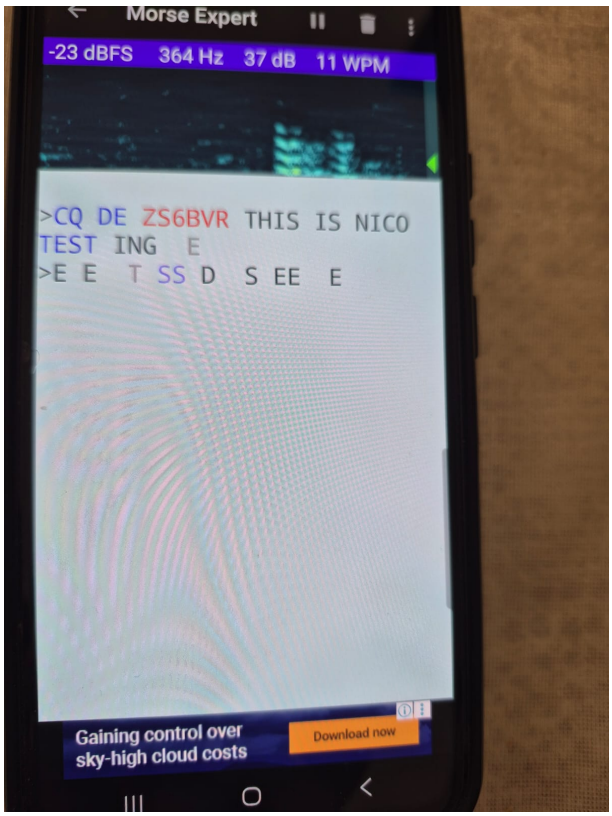
```
ZS6BVR Morse Code Sender Version 2.1
Speed: 12 WPM    Tone: 800 Hz
Calibration Factor: 1.0
Type message or special key and press ENTER
Special keys: * = quit, + = faster, - = slower, @ = dots (scope), # = tone, #ML = make lessons, #L1–#L9
Type #H for help

12 WPM >  CQ DE ZS6BVR THIS IS NICO TESTING
Text: CQ DE ZS6BVR THIS IS NICO TESTING
```

And here I received it from my phone:



And then the completed message



Then my wife spoke and you see noise text
This was good enough to prove that it worked
And my 800Hz Tone was 6Hz off not bad!

You can down load this from here :
https://github.com/nic0michael/ZS6BVR_MorseCodeSenderPiPico

If you know how to Git Clone this project you will be able to pull down the latest future updates

You will find circuit diagrams here

3. ZS6BVR Morse Sender (Java Project)

This program uses you computers Sound System to send Morse code
The purpose of this program is to help you increase you Morse code receiving speed

This is the ULTIMATE MORSE TRAINER PROGRAM
I have not seen a program with all its features.
It can send groups of five “wide-spaced” sent at 20WPM but effectively 10WPM helping you increase your receive speed. In 1980 I wrote my first program to do that and passed the 12WPM ZS exam.

Features:

1. A unique feature is it generates 9 new Lesson files

    a. 3 files with Random groups of five
    b. 3 plane English word files
    c. 3 random Callsign files

It also has commands :
a. [n] will sent n lines on random groups of 5
b. @ will send continuous dots (scope calibration)
c. # will send continuous tone (frequency counter calibration)

You can down load this program from here :
https://github.com/nic0michael/MorseSender

Where you can get installation Instructions

If you know how to Git Clone this project you will be able to pull down the latest future updates

4. Software Requirements

This will depend on which hardware or software option you want to use.

The Java program (Morse Trainer) requires :

- Java 17 or later
- Maven if you want to build and run.
- Git is useful for cloning both projects and keeping up to date with future updates.

The Pico program (CW transmitter and Receiver) needs:

- MicroPython firmware flashed onto the Raspberry Pi Pico 2 W.
- Thonny IDE is recommended to upload and run the Python script on the Pico.
- Git is useful for cloning both projects and keeping up to date with future updates

5. Hardware Requirements

This will depend on which hardware or software option you want to use.

For the Raspberry Pi Pico version, you need:

- The Raspberry Pi Pico 2 W (We plan to introduce a WIFI remote option)
- Reed Relay
- 2N3439 NPN transistor
- 7805 voltage regulator
- USB cable
- Small fuse are recommended for safe operation.

For the Java version (Morse Trainer), no extra hardware is needed beyond a computer with a sound card and speakers or headphones.

6. Installation Steps

Clone the projects

Git clone both repositories: the “Morse Trainer” (Java-based) and the “CW Sender and Receiver” (Pi Pico-based). Refer to the online instructions of my two projects here in Github:

https://github.com/nic0michael/MorseSender (Morse trainer)
https://github.com/nic0michael/ZS6BVR_MorseCodeSenderPiPico (CW Sender and Receiver)

You can also get comprehensive instructions there

7. Command Overview

Morse Trainer (Java Program)

@ → Continuous dots (scope calibration)
# → Continuous tone (frequency counter calibration)
[n] → Send n lines of random groups of 5
+ or - → Increase or decrease speed
#H → Show help
[text] → Repeat text 3 times with pauses
* → Exit program

What ever text you type will be sent

CW Sender and Receiver (Pi Pico Program)

@ → Continuous dots (scope calibration)
[n] → Send n lines of random groups of 5
+ or - → Increase or decrease speed
#H → Show help
[text] → Repeat text 3 times with pauses
* → Exit program

What ever text you type will be sent

8. Future Development

Software developments

1. We plan to write our own Adaptive CW Reader program
2. We also plan to add WIFI remote to our CW Sender Receiver so you can control this from the Browser

Hardware developments

1. After EagleCAD made their recent announcement we are now moving to KiCAD which is Open-source and **Fully FREE**.
2. This means we have to re-design our PiPico Transciever board

9. Contribute & Feedback

How to report bugs, request features, or contribute via GitHub.

Send us an email to : **nicomichael AT yahoo DOTCOM**
We will be looking for someone to help us with our KiCAD drawings verify them