Morse Trainer

Release 1.5

User Manual

May 30, 2025

CONTENTS

TopBytes Morse Trainer. Small portable battery powered device to help with learning to send and receive morse code. Connect your own straight key or morse paddle using a *standard 3.5mm stereo plug*.

To purchase please complete this sales form. The cost is £72 and includes VAT and shipping to a UK address.
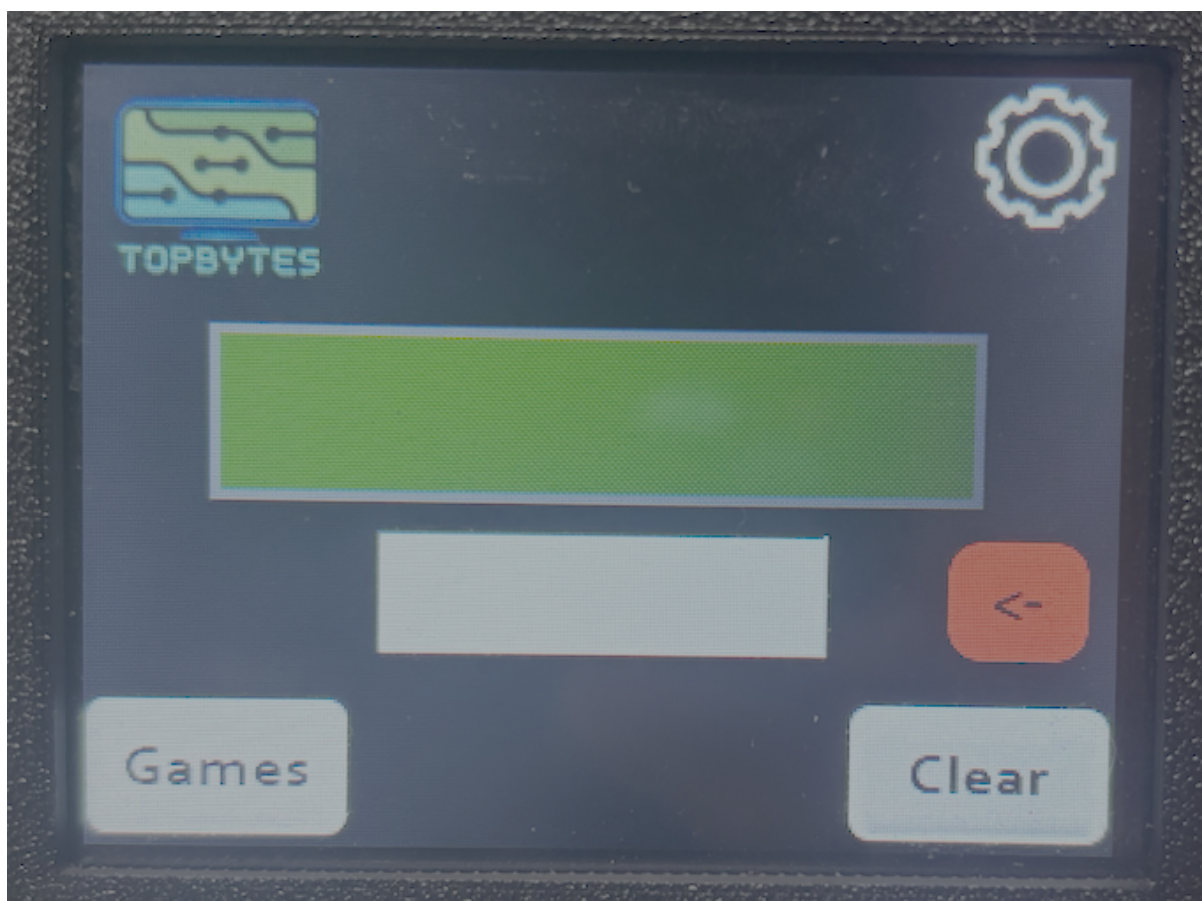
INTRODUCTION

Thank you for purchasing the Morse Trainer. Here you will find details about all the different features of it. We continue to improve the trainer, so please check back here regually for new releases.

If you have an idea for a new feature then please complete this form with the details.

1.1 Main Screen

After power on the main screen is displayed.

Clicking on the logo in the top left corner, will display the "About" screen, where you can perform a *Firmware Upgrade*.

Top right is the *Settings* Cog, clicking here will display the settings pages allow reconfiguration of the unit.

The green box in the middle displays the characters which have been decoded from the morse received, while the white box below will show the raw morse as received.

To the right is the **delete** button. Clicking this button will remove the last character decoded.

The *Games* button allows the selection of a game to play or other acties.

The **Clear** button will clear the history of received characters and morse.

GAMES

There are currently four games built into the morse trainer. The games are designed to aid in both sending and receiving morse.

Select a game below to learn more about it.

2.1 Listen

The listen game generates a random string of characters of the length defined by the slider. **Play** will play out the morse associated with the string. Try and write down the letters. **New** will generate a new string.

Pressing on the green box in the middle will reveal the string to provide confirmation.

2.2 Random Letter

On the right is a random character, and below is the morse sequence for it. Press on the morse box to hide it.

on the left side is the morse and character received from the key or paddle.
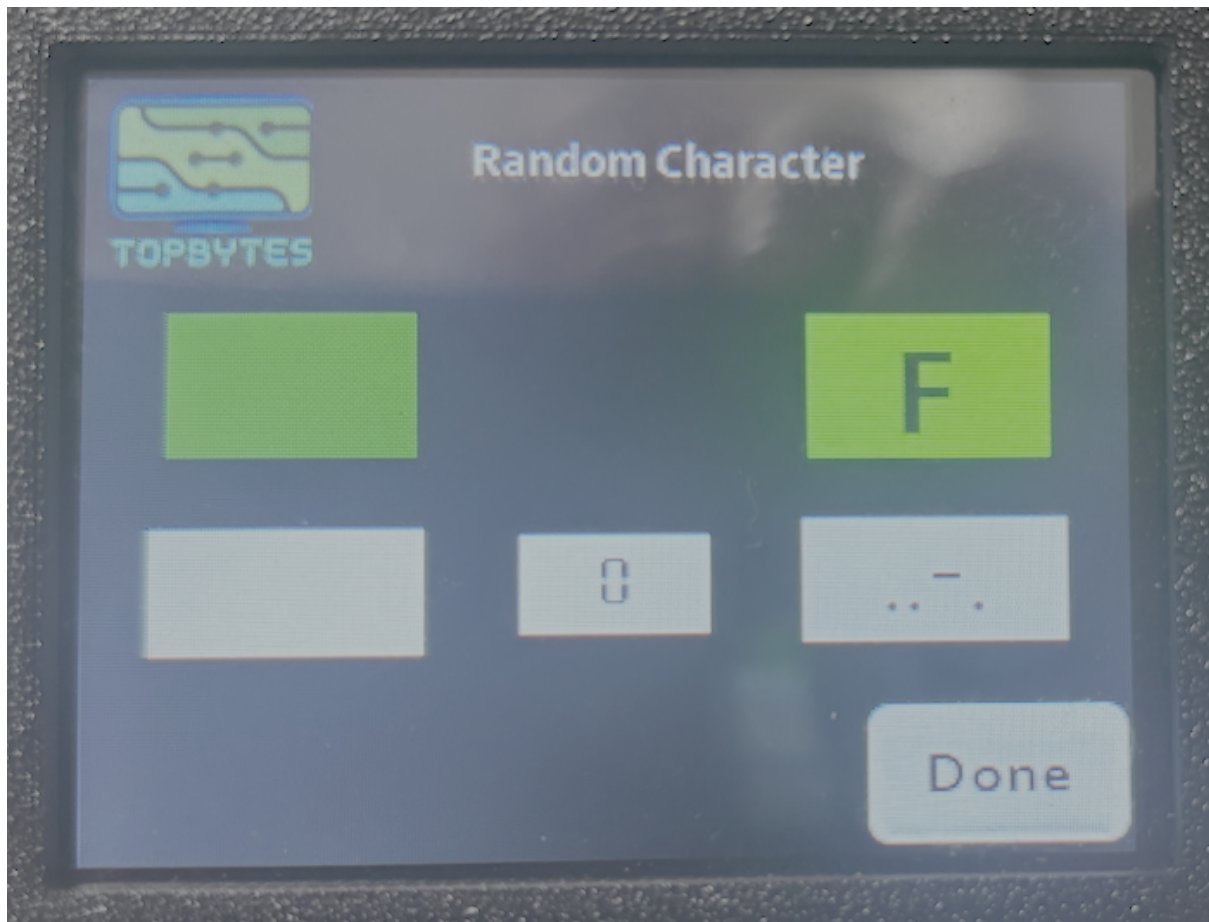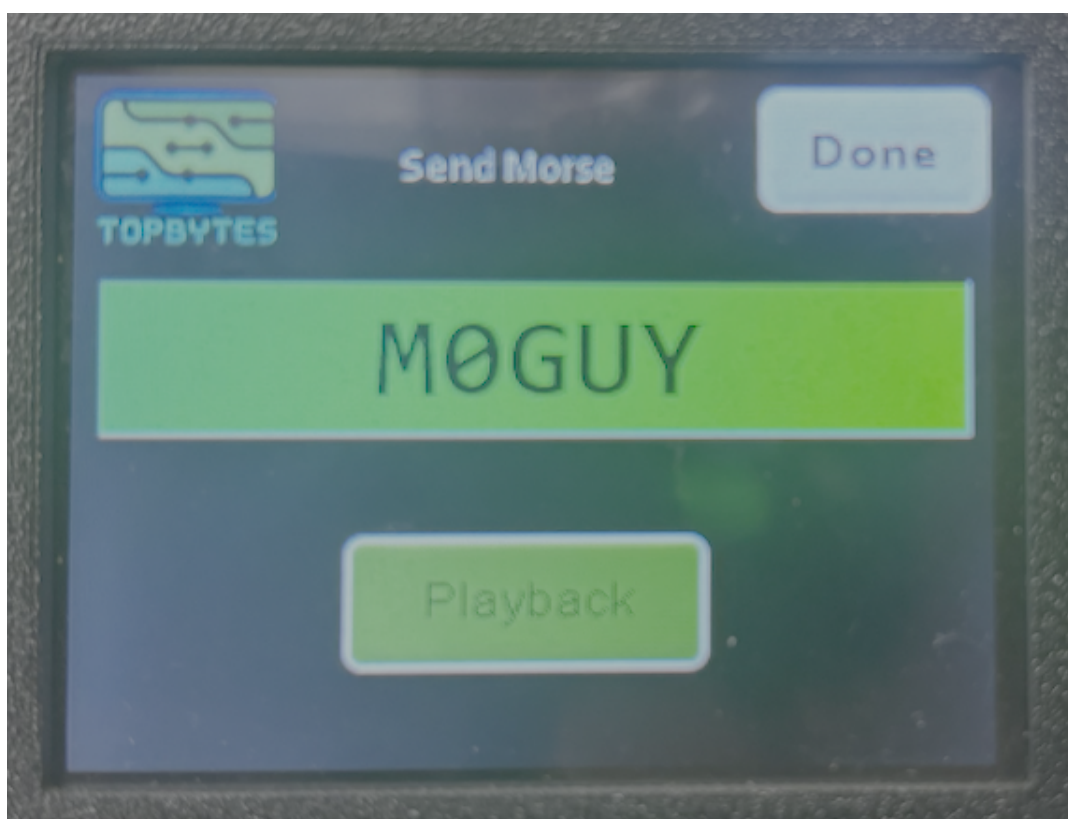
2.3 Send Random String

With the send game, a random string is generated of the length defined by the slider.

At the bottom is the raw morse and characters received. When the characters match the Morse Trainer will move onto a new string.

2.4 Send Letters

Select on the green box to enter a string you would like to send. Press "Playback" to start sending the morse.
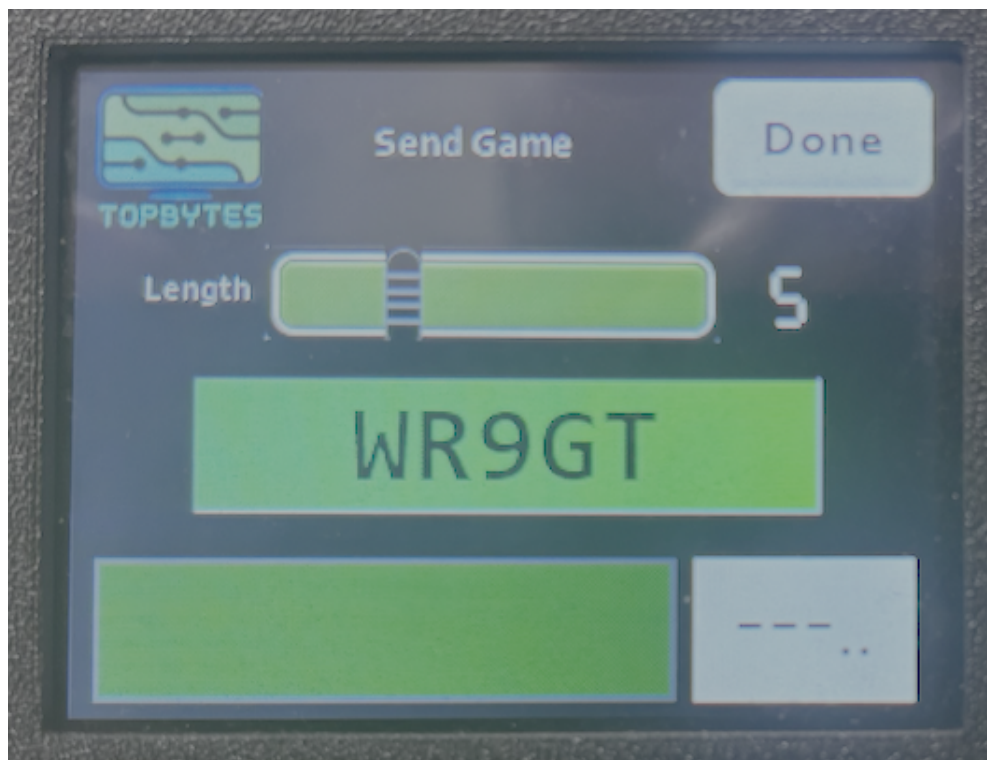
SETTINGS

Pressing the cog on the main page will take you into the settings pages.

3.1 Page 1
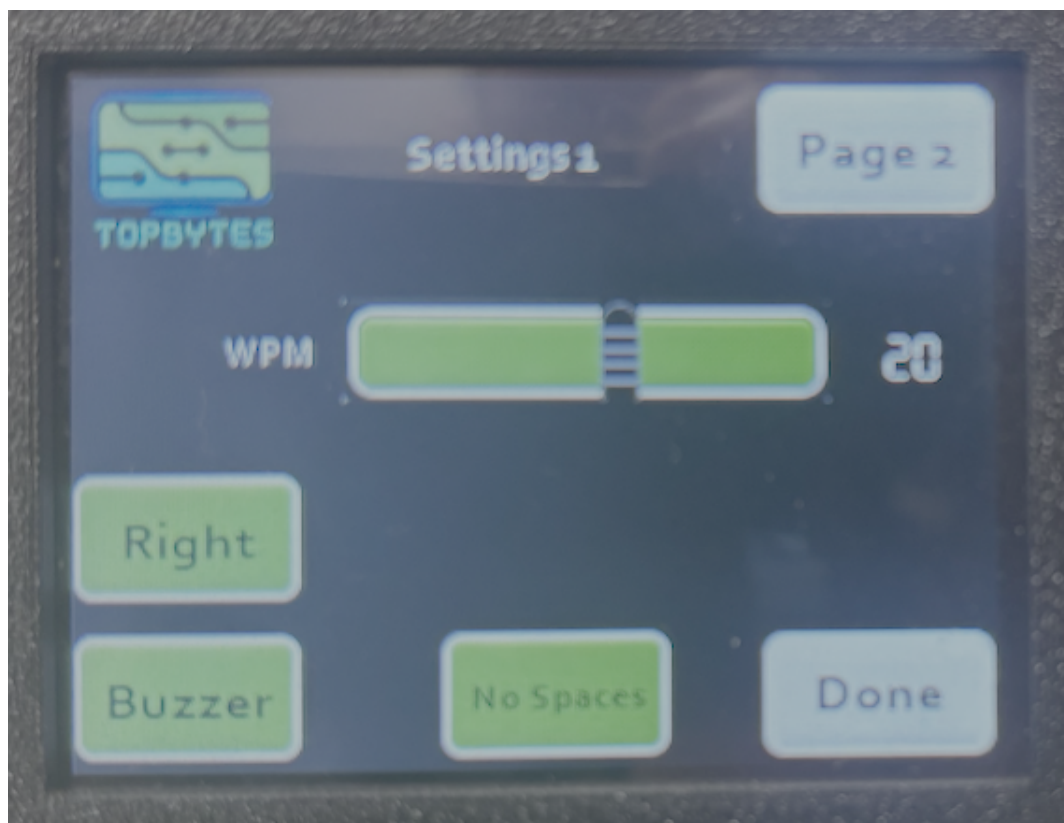
- **WPM**, Words Per Minute, Move the slider to change the length of a dot, which in turn will determine the length of everything else.

- **Right/Left**, Switch the paddle for Left and Right handed, ie which side of the paddle is a dot and which is a dash

- **Spaces**, add a space to the output when the delay between characters is long enough.

Select the **Done**, button to return to the main page. Pressing **Page 2** will take you to the next page of settings.

3.2 Page 2
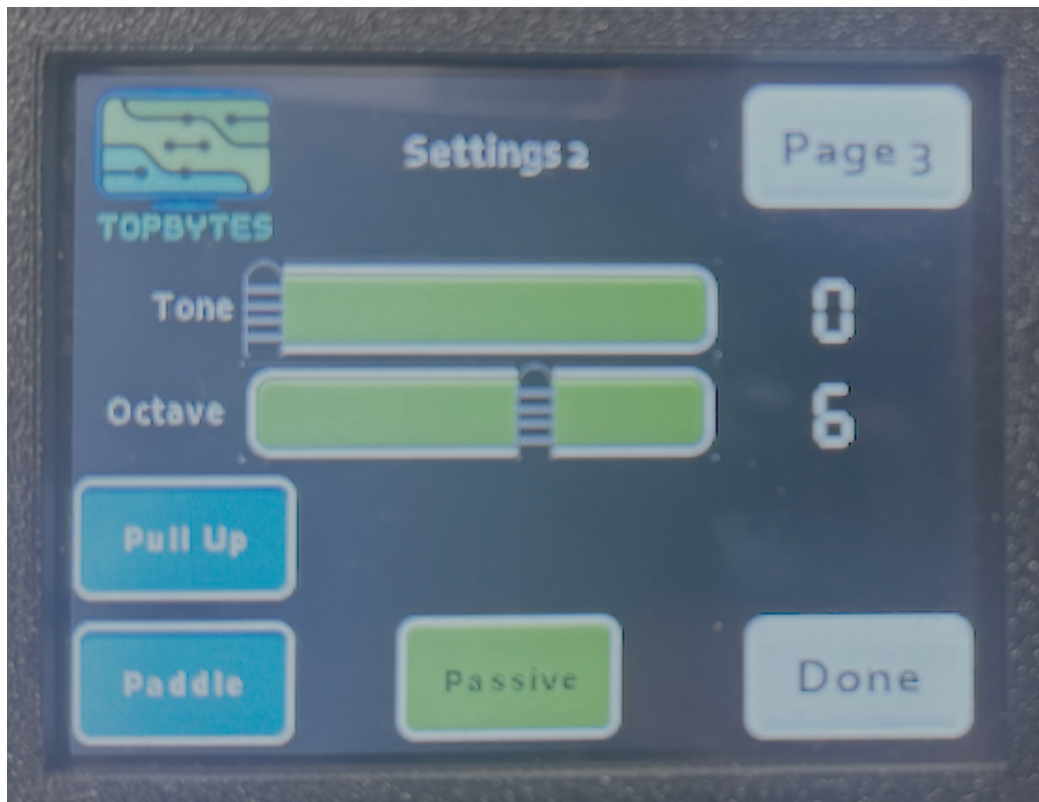
- **Tone**, Select the tone for the morse buzzer
- **Octave**, Adjust the octave of the morse buzzer
- **Pullup/down**, By default the Morse Trainer is checking for the paddle to connect to ground when a dot or dash is keyed.
- **Paddle/Straight**, Select between using a Paddle and a straight key.
- **Passive/Active**, Select between Passive and Active Buzzer.

Note: Tone and Octave settings are only valid when using a "Passive" buzzer and hidden otherwise.

3.3 Page 3 - WiFi Settings

Configuring WIFI, select on the "SSID" and "Password" boxes to enter the credentials to connect to your WIFI network.

HARDWARE

4.1 Power Switch

Fig. 1: Right of unit with power switch

The power switch is on the right side of the unit, move the switch forward to turn on the unit, and push away to turn off.

4.2 Morse Key socket

On the Right side is a 3.5mm stereo style socket into which you plug your morse straight key or paddle.

- **Shield** is wired to the common ground.
- **Ring** is wired to dash side of paddle or not connected
- **Tip** is wired to dot side of paddle or straight key

Fig. 2: 3.5mm jack plug

4.3 Charging

Fig. 3: Back of unit showing charging lights

If you observe the screen begin to flicker then it's a sign the battery is getting low. Plugin to recharge the battery.

The unit can continue to function while recharging.

The Morse Trainer has a 18650 Li-ion battery inside. This will run the unit for around a day. This battery can be recharged via the USB-C socket on the left side. At the back a red light is displayed while charging and blue when the battery is fully charged.

4.4 NRC unit

A Morse Trainer unit has been dontated to the NRC (National Radio Center, Bletchly Park). It's on the front reception desk for anyone to practice their morse code. If you can't find it please ask a member of staff.


Fig. 4: NRC demo unit with paddle and morse reference chart

The paddle is also 3D printed, details of making your own paddle can be found on Thingiverse https://www.thingiverse.com/thing:7023246

FIRMWARE UPGRADE

As new features are released. New firmware for the Morse Trainer will be released. There are two systems which will need to be upgraded, the screen and the micro processor.

Danger: Make sure the unit has enough battery power or plugged in during the upgrade.
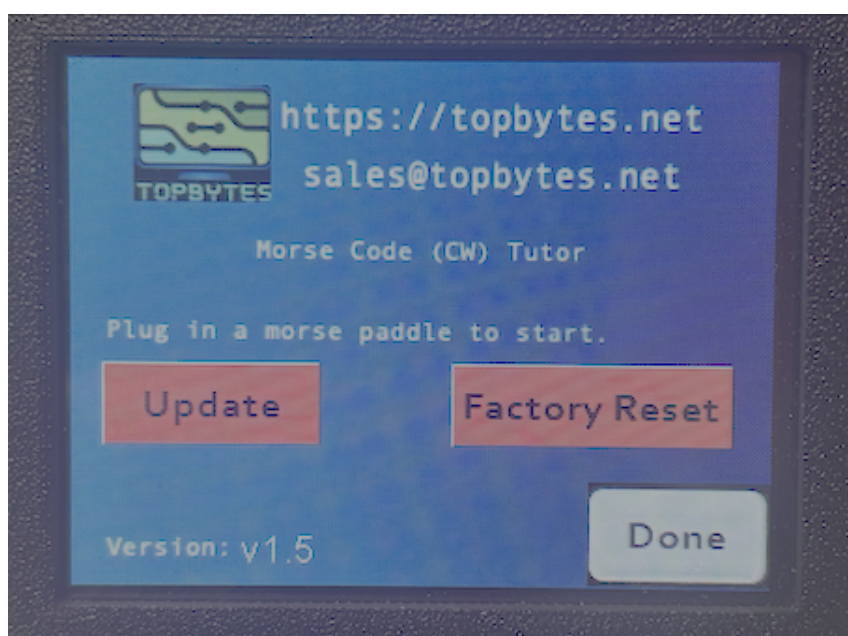

The simplest way to upgrade the firmware is to provide the Morse Trainer with a WiFi connection, and then press the "Update" button on the About screen.

On pressing the "Update" button, if you have configured the WiFi the Morse Trainer will connect to our servers and start downloading the firmware for the micro processor. Once the firmware is received and validated the unit will reboot. On reboot should a new screen firmware be required, this will then be downloaded and written to the screen. Once complete the unit will reboot again and be ready for use.

Danger: Do not turn off the unit until the upgrade has completed.

You should notice the version on the boot screen and About page have changed to reflect the new image.
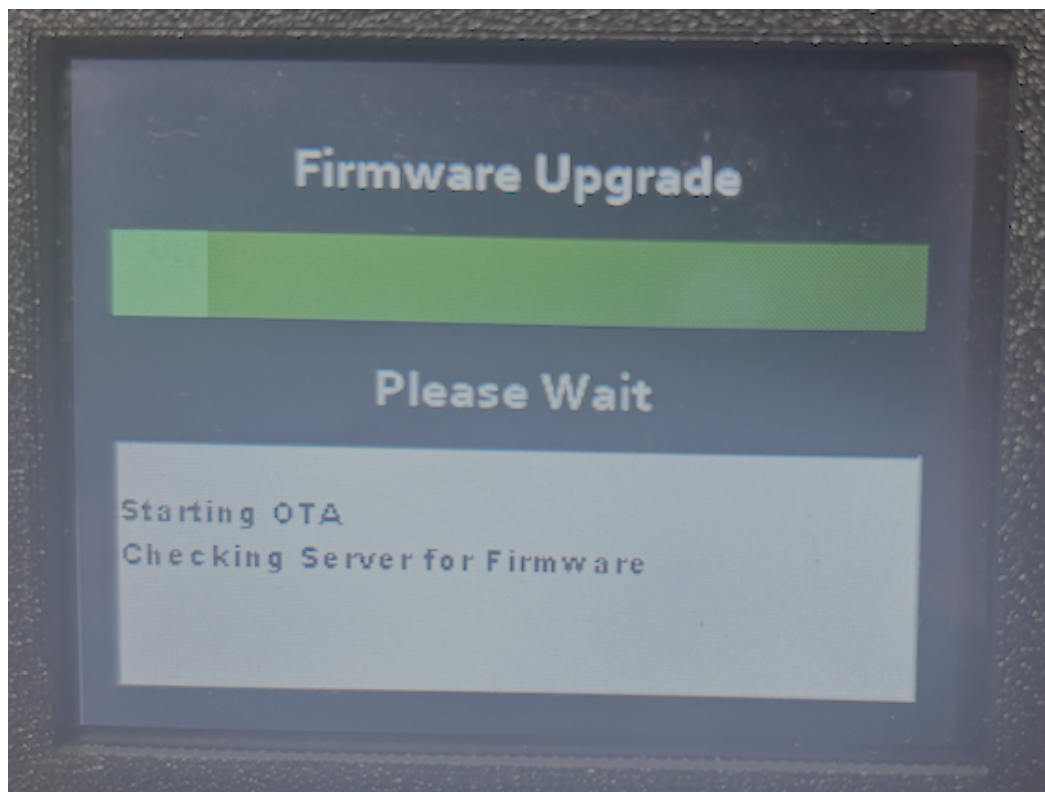
5.1 Emergency Recovery

Should the Over The Air (OTA) firmware update fail and the system stops to function, it's possible to recover the system directly. You will need to unscrew the 4 case screws on the sides and pull apart. Inside you will see the micro processor board with it's own micro USB socket.

You will need a micro USB to USB cable (make sure it's one which provides data not just power). Plug the Morse Trainer into your computer.

Note: You need to use the Chrome web browser to perform the upgrade

Click on the "Connect" button above and select the USB port associated with your Morse Trainer

Once connected you'll see a dialog with two options

- INSTALL MORSE TRAINER
- LOGS & CONSOLE

Select the "Install Morse Trainer" to begin reinstalling the firmware. Once the firmware is restored, it will connect to the screen and check it's firmware. If necessary it will attempt to upgrade it. However if you haven't configured WiFi then this will fail.

If the screen upgrade fails, you will need to force the update. Copy the TFT file to a micro SD card formatted FAT32.

Note: Make sure the Micro SD card doesn't have any other files in the root folder.

Install the SD card into the screen and power on the Morse Trainer. Wait for the install to complete. Power off the Morse Trainer, and

remove the SD Card.

Power the unit back on and it will be recovered to the latest version.

5.2 Factory Reset

Factory reset will restore all the Morse Trainer settings back to their defaults.

Should the Morse Trainer stop performing as expected, first plug the Morse Trainer into USB power and allow to charge. If after recharging the battery it's still having issues, you can try to resetting to factory defaults.
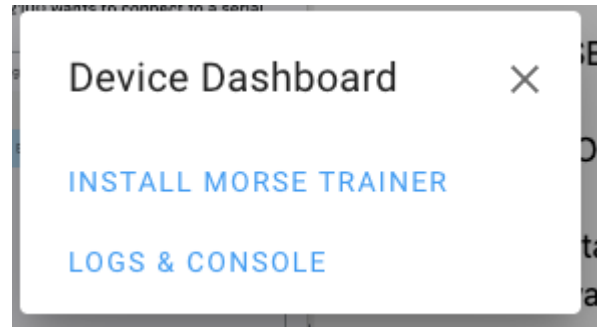
5.3 Console

Selecting Console will provide debug information during operation. You can also send commands via serial to the micro processor. This is most useful for debugging and development.

5.3.1 Update Screen

```
update screen
```

This will force a redownload and update of the screen. It doesn't matter the current version running.

5.3.2 Update Firmware

```
update firmware
```

Update the firmware on the micro processor, same function as pressing the "update" button on the about page.

5.3.3 SSID

```
ssid <WIFI NETWORK NAME>
```

Update the WIFI network name.

5.3.4 WiFi Password

```
password <WIFI PASSWORD>
```

Update the WIFI network password, this can be helpful if the password is complex, and can be hard to type in on the touch screen.

5.3.5 Reboot ESP

```
reboot esp
```

Restart the micro processor.

5.3.6 Reboot Screen

```
reboot screen
```

Restart the screen. After the screen has restarted, it will appear to hang only showing the "Boot" screen. This is because the micro processor thinks the screen is on a different one. It's therefor necessary to also reboot the esp afterwards.

5.3.7 restore

```
restore
```

Factory reset the Morse Trainer to defaults.

MORSE CODE

Listed below are the morse character sequences which are currently understood by the Morse Trainer.

6.1 Standard Morse Characters

Morse	Letter	Morse	Number
.-	A	-----	0
-...	B	.----	1
-.-.	C	..---	2
-..	D	...--	3
.	E	....-	4
..-.	F	.....	5
--.	G	-....	6
....	H	--...	7
..	I	---..	8
.---	J	----.	9
-.-	K		
.-..	L		
--	M		
-.	N		
---	O		
.--.	P		
--.-	Q		
.-.	R		
...	S		
-	T		
..-	U		
...-	V		
.--	W		
-..-	X		
-.--	Y		
--..	Z		

6.2 Punctuation characters

Morse	Character
--..--	,
..--..	?
---...	:
-....-	-
.-..-.	"
-.--.	(
-...-	=
-..-	x
.-.-.-	.
-.-.-.	;
-..-.	/
.----.	'
..--.-	_
-.--.-	)
.-.-.	+
.--.-.	@