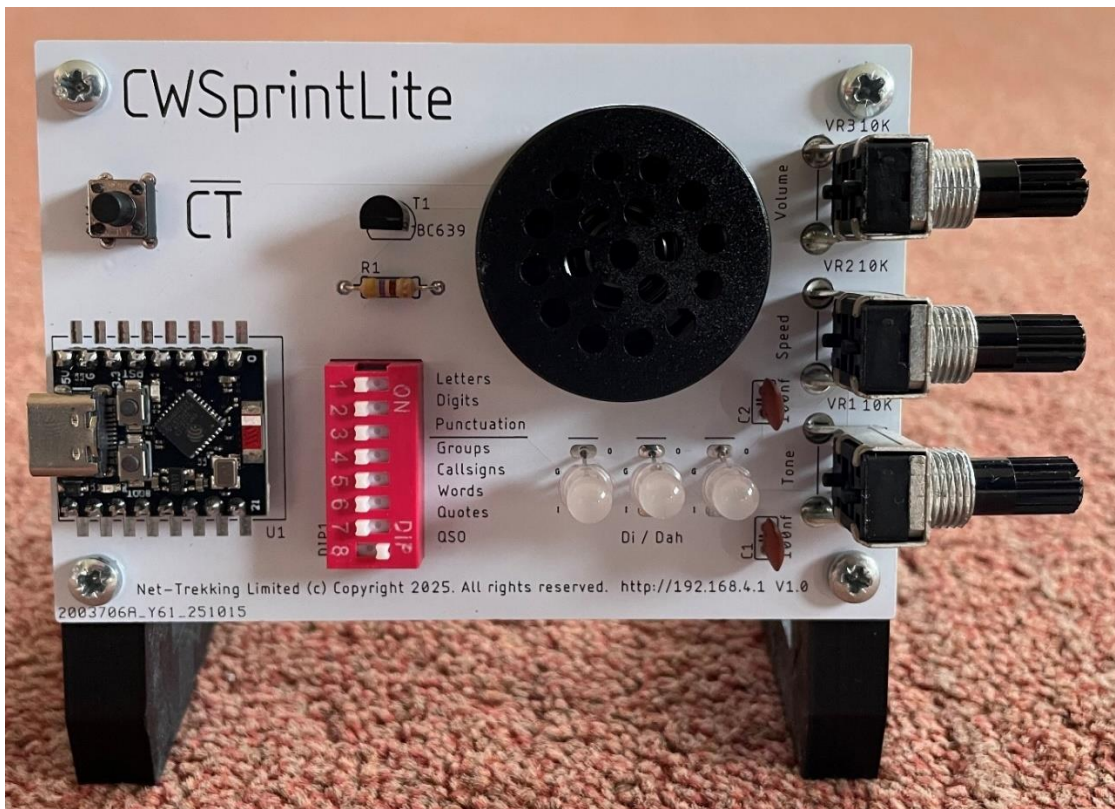# CWSprintLite

Net-Trekking Limited

Version 0.2 Rev A

http://www.Net-Trekking.com

"Every Geek should have one!"

Simple, easy build kits following a brutalist style that every geek should have.

CWSprintLite

Note

All callsigns generated by CWSprintLite are fictitious and have no relation to any matching really callsigns.

Contents

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1. Introduction

Learning Morse code is never easy, you really must surround yourself in a World of Dits and Dahs. CWSprintLite can help with that. On the pressing of a single button, you can get a quick burst of CW at any complexity level you desire – simple groups, callsigns, words, quotes, and QSO overs.

2. Safety

Note that the Hot Air Solder Levelling (HASL) applied to the PCBs is not lead free. HASL with lead is one of the traditional PCB manufacturing processes and has been in use for many years. Its main component is a tin-lead alloy (usually in a 63/37 ratio). The advantages of this process lie in its excellent wetting and soldering performance.

Before handling any of the parts please do your own research and satisfy yourself about the safety of the kit and the solder that will be used during the assembly.

3. Assembly

Assembly is relatively easy and will probably take no more than an hour.

3.1. Required Tools

To assemble the kit, you will require the following tools:

Tool	Comment
Small soldering iron	
Solder	See safety notes above.
Wire cutters	
Small cross head screwdriver	

3.2. Parts List

| Part	Quantity	Comment
Bolt M3 12mm	4	
Capacitor 100nf	2	C1, C2
DIL Switch 8 way	1	DIL1
ESP32 C3 SuperMini	1	U1
LED WS2812B APA-106	3	LED1, LED2, LED3
Nut M3	3	
PCB	1	
Resistor 470 Ohms	1	R1

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Speaker 8 Ohms	1	SP1
Stand – Left hand side	1	
Stand – Right hand side	1	
Switch - Tactile	1	SW1
Transistor BC639	1	T1
USB Cable	1	
Variable Resistors – 10K Ohms	3	VR1, VR2, VR3

3.3. Assembly Steps

Assembly is sometimes easier working from the lowest profile components to the highest. With that in mind the suggested order of assembly is given below.

3.3.1. Resistor - R1

Start with resistor R1. Mount it flush to the PCB with the gold band to the right. It can be orientated either way but with the gold band to the right then the value of the resistor reads left to right as expected. Once complete the PCB will look like:
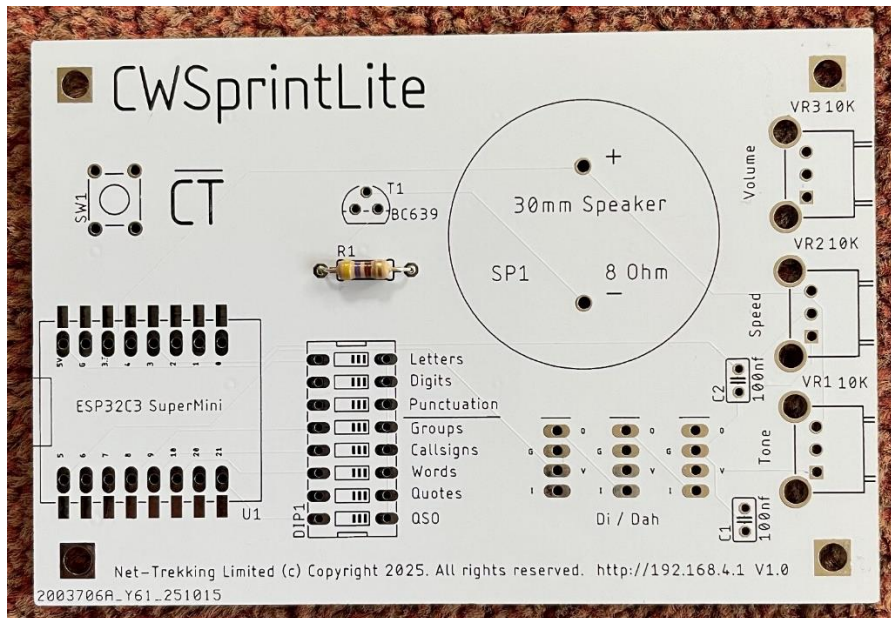
3.3.2. Capacitors - C1 & C2

Next insert the two capacitors C1 and C2. Mount them flush to the PCB with the label on the left-hand side. Again, this can be mounted either way around, but the value is easier to read looking left to right. Once complete the PCB will look like:

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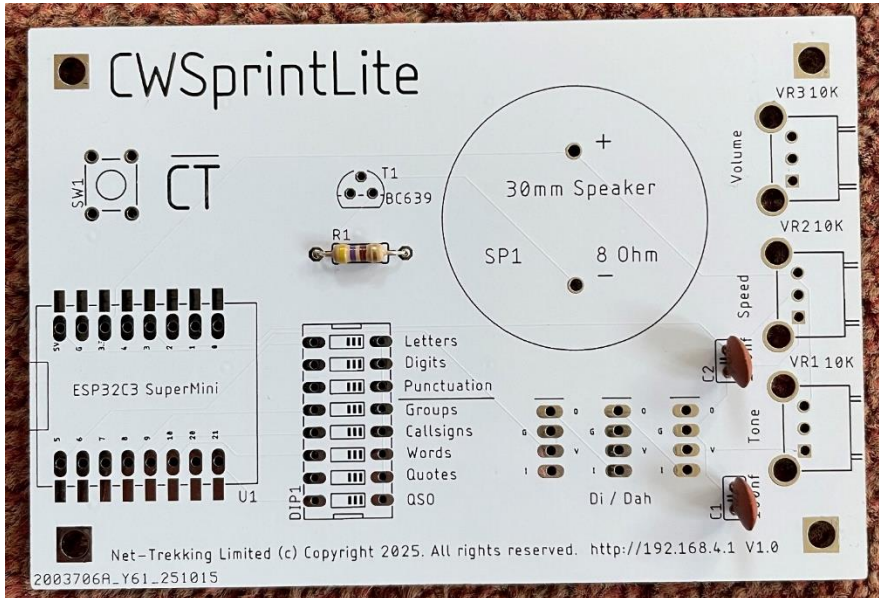
3.3.3. Tactile Switch – SW1

Next insert the tactile switch and apply solder. Once complete the PCB will look like:
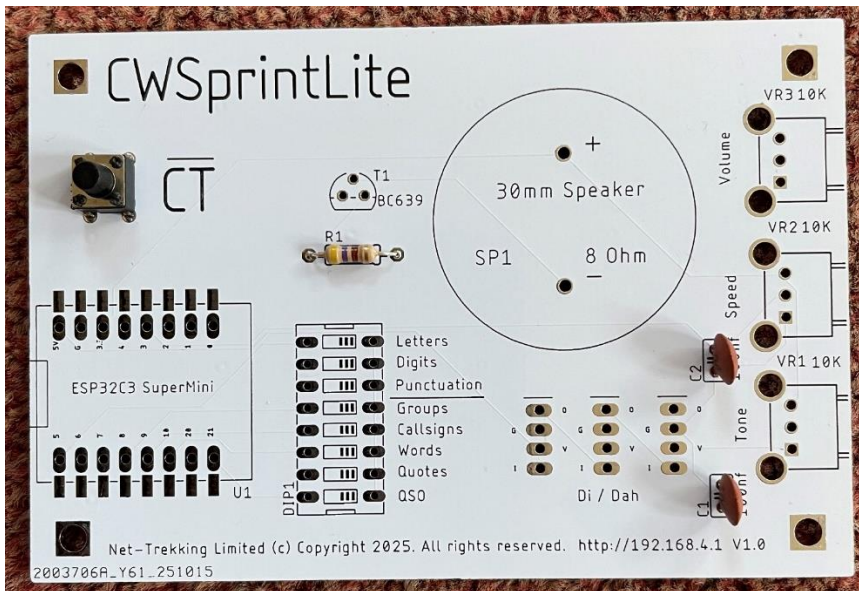
3.3.4. Transistor – T1

Next insert the transistor T1. Mount it flush to the PCB in the orientation shown on the PCB.
Once complete the PCB will look like:

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3.3.5. LED Array

Next insert the LED array. The LED array needs to look smart; all the LEDs need to be set at the same hight and form pleasing rows and columns when viewed from the side. To achieve this, it is recommended to insert all LEDs into the PCB. The flat edge of each LED should be at the top paired with the small horizonal line on the PCB. Then solder the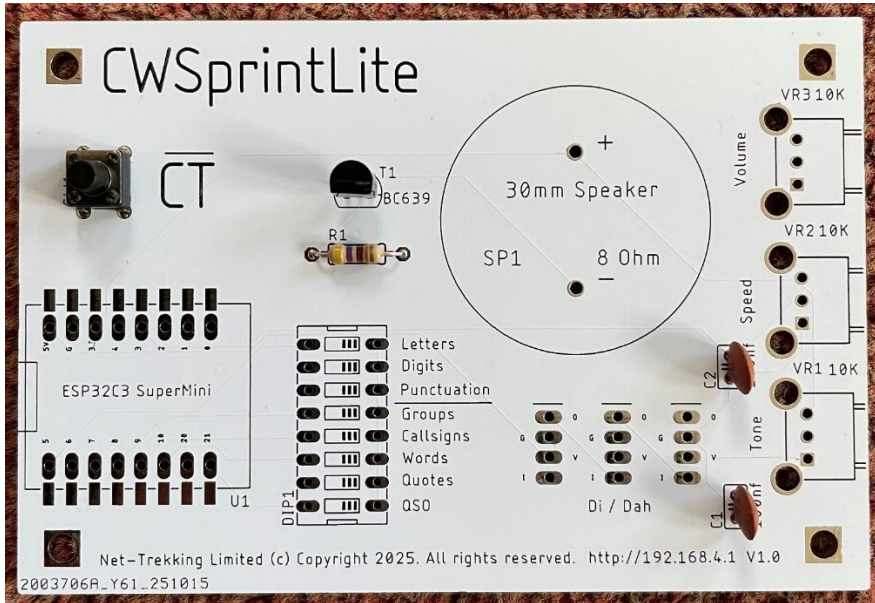 top pin of each LED. Once complete recheck the LED hights, row, and column alignment. Make any required adjustments and then solder the bottom pin of each LED. Check the alignments and make any adjustments before finally soldering all the LED pins.

The LEDs may also be orientated by the length of the legs. Please ensure that the long legs are inserted at the top.

Once complete the PCB will look like:

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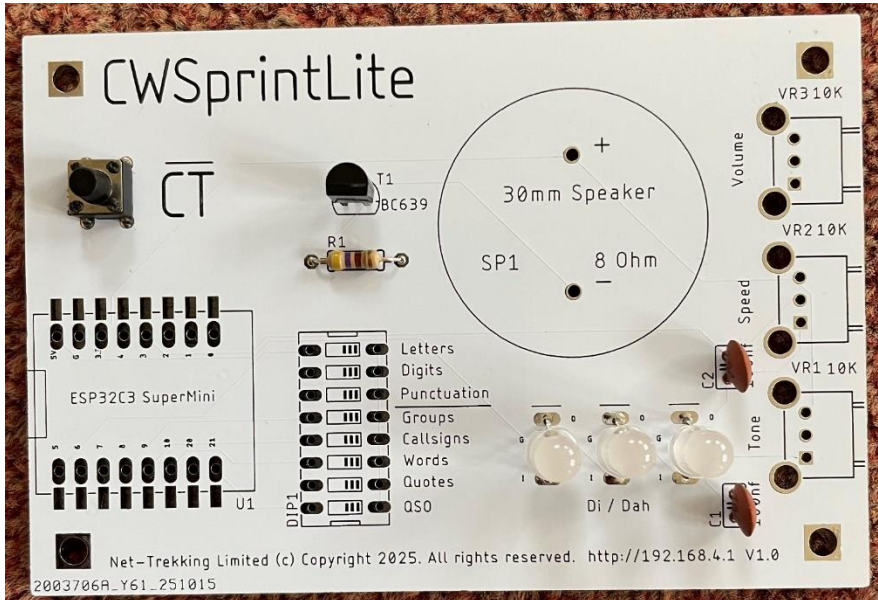
3.3.6. DIL Switch – DIL1

Next insert the 8-way DIL switch. This should be orientated so that the word "ON" printed on the switch it top right adjected to the word "Letters" on the PCB. The easiest way to do this is to solder two pins at opposite ends of the switch, make sure it sits flush, and then complete the soldering of the remaining pins. Once complete the PCB will look like:
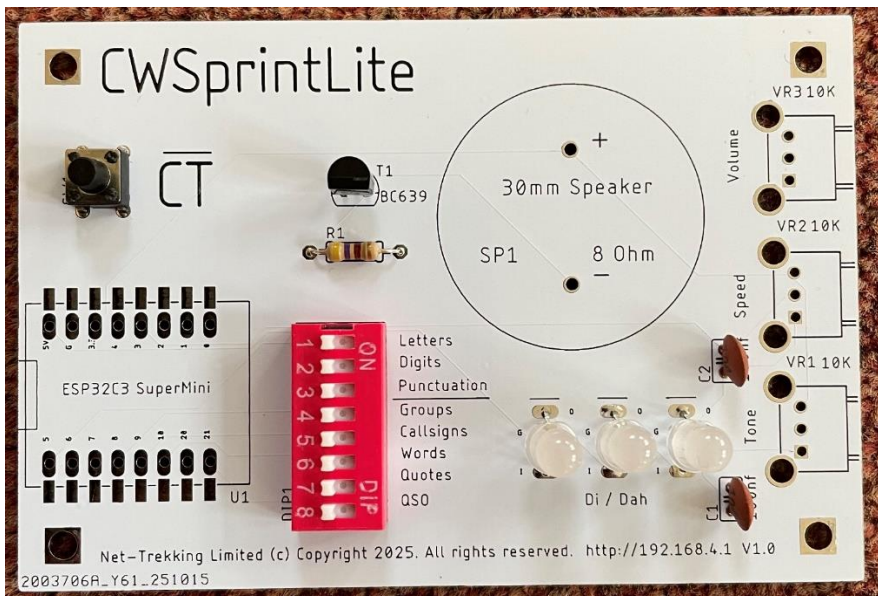
3.3.7. Variable Resistors – VR1, VR2, & VR3

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Next insert the variable resistors. Again, solder one pin of each and check the alignment and ensure that they sit flush to the PCB. Once happy, solder the remaining pins and lugs. Once complete the PCB will look like:
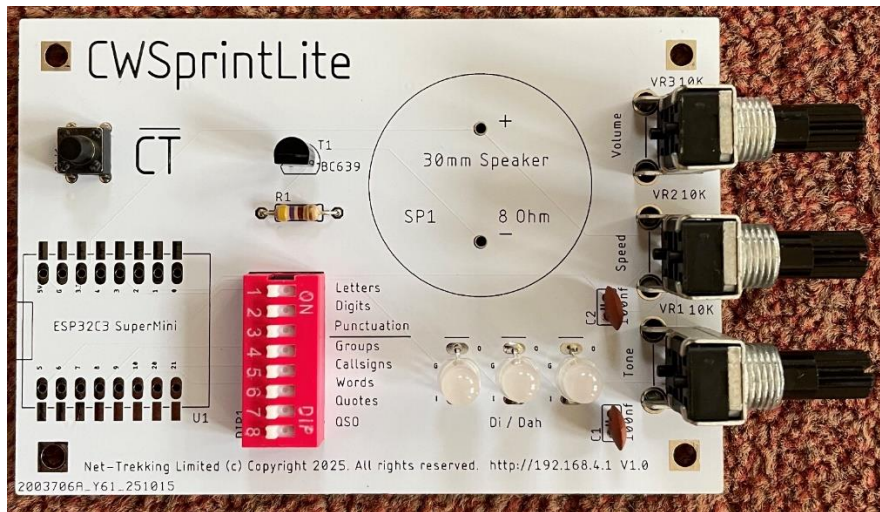
3.3.8. Speaker – SP1

Next insert the speaker. Ensure that the orientation is correct the of pin marked "+" being at the top. Once complete the PCB will look like:

3.3.9. ESP32 C3 Header Pins and ESP32 – U1

Next insert the two rows of header pins for the ESP32 C3 and solder them home. Solder one pin of each strip and make sure the pins are flat against the PCB before completing all the soldering. The long pins go through the PCB. Place the ESP32 C3 on the pins and apply solder. Once complete the PCB will look like:

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3.3.10. Attach the Stand

Each side of the stand is attached with two 12mm bolts. Before attaching to the PCB put each bolt in a hole, apply the nut, and tighten up. This should pull the but into the leg so that it sits flush with the leg surface. The right-hand side has the cutout / cable restraint in the lower limb.

4. Functionality

At this point power may be applied. At start up the three LEDs will flash a simple pattern, solid white, red, green, and finally blue. Once complete it will announce the device name and version in Morse code. The three potentiometers can be used to adjust the volume, speed, and tone. It will then fall silent.

The functionality is then driven by the 8-way DIL switch and the tactile switch labelled CT.

There are five distinct modes of output.

- Groups
- Callsigns
- Words
- Quotes
- QSO

Output starts when the CT button is pressed. The CT button can also be used to stop any output currently being generated.

If multiple modes are selected, then a random mode from the selection will be generated.

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4.4. *Groups*

In this mode groups of random characters will be generated. The characters generate are controlled by the top three switched labelled "Letters", "Digits", and "punctuation". Any combination of these switches can be turned on to generate any required combination of characters. If only "Letters" is turned on, then only letters will be generated. If "Letter" and "Digits" are both turned on then letters or digits will be generated, etc. By default, each group will be built from five random characters, and five groups will be generated.

4.5. *Callsigns*

In this mode random callsigns will be generated. By default, five callsigns will be generated.

4.6. *Words*

In this mode random words will be generated. By default, five words will be generated.

4.7. *Quotes*

In this mode a single quote will be generated.

4.8. *QSO*

In this mode a single qso over will be generated.

5. Browser Interface

Further settings and output can be viewed through a Web interface hosted by the device itself. By default, an access point called CWSprintLite should be visible to a phone or Wi-Fi enabled personal computer. Connect to the access point and browse to:

http://192.168.4.1

A page like that below will be display:

CWSprintLite

CWSprintLite V0.9

Data V1.0 05-NOV-2025 18:07:58

Home   Settings   About

This gives the version number of the code and the version number and build data, of the data used to generate output.

When the CT button is pressed the output generated can be seen on the home page. For example:

CWSprintLite V0.9

Data V1.0 05-NOV-2025 18:07:58

Home   Settings   About

R R FR6SGZ DE G2JW = FB FB ALL CPI MATTHIAS IN VINCENDO HERE ANT IS 2 EL BEAM PWR 50 WATTS RIG YEASU FT-DX10 FB QSO = 73 ES CU AGN FR6SGZ DE G2JW $\overline{SK}$

5.9.   Settings

The Settings page allows for more control of the generated output etc. If changes are made the "Update" button at the bottom of the form must be pressed to save the changes.

5.9.1. Access Point

Access Point

Click for help.

| Access Point SSID: | CWSprintLite |
| Access Point Password: | 64 characters maximum |

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The access point related controls can be used to control the following:

- Access Point SSID - The SSID associated with this device. If multiple CWSprintLite devices exists on the same network, then it be necessary to give each device aa unique name.
- Access Point Password - The password associated with the device SSID. The field can be left blank if password access is not required.

5.9.2. Groups

Groups

Click for help.

Group Count (1 - 30):   5 ⌄
Group Length (1 - 10):   5 ⌄

The Groups related controls can be used to control the following:

- Group Count - This controls the number of groups generated. This ranges from 1 to 30 with 5 being the default.
- Group Length - This controls the number of characters in each group. This ranges from 1 to 10 with 5 being the default.

5.9.3. Callsigns

Callsigns

Click for help.

Callsign Count (1 - 30):   5 ⌄

The Callsigns related controls can be used to control the following:

- Callsign Count - This controls the number of callsigns generated. This ranges from 1 to 30 with 5 being the default.
-

Words

CWSprintLite

Click for help.

Word Count (1 - 30): [5 ∨]

The Words related controls can be used to control the following:

- Word Count - This controls the number of words generated. This ranges from 1 to 30 with 5 being the default.

5.9.4. Morse LED Display

Morse Led Display

Click for help.

Morse Led Brightness (1 - 255) 255 being the brightest: [20 ∨]

Morse Led Colour: [☐] [Red] [Green] [Blue] [White]

Update [Update]

The More Led Display related controls can be used to control the following:

- Morse Led Brightness - This controls the brightness of the Morse led display. This ranges from 1 to 255 with 255 being the brightest.

- Morse Led Colour - controls the colour of the LED's used to display the Morse code. The default is white. Simple colours red, green, blue, or white can be selected by simply clicking on the button. The chosen colour will be displayed in the box at the start of the line. If the box is clicked on, then the browser built-in colour picker will be displayed to allow any desired colour to be chosen.

6. Software Updates

Software updates are made available via the website http://www.Net-Trekking.com. Simple follow the Download menu option and chose the product for which the update is required.

You will need to download the esptool.exe and the binary (.bin) file for the latest software. Place both files in the same folder and open a command window and move into that folder.

Plug the device plugged into a USB port.

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The ESP32C3 needs to be in Bootloader mode. To enter this mode, you will need to locate the boot switch and reset switch on the ESP32C3. These are simple momentary push switches located to the right is the USB socket. The boot switch is the lower of the two. Push and hold the boot switch, push and release the reset switch, and then release the boot switch.

Now execute the following command in the command window.

./esptool.exe --chip esp32c3 --baud 921600 --before default_reset write_flash 0x0 CWSprintLite_V0.2_PCB_V1.0.bin

Ensure that the name of the .bin file matches that of the one just downloaded.

Once completed momentarily press the reset button. The device will then do a normal startup.

Contact support at Support@Net-Trekking.com is this fails.