

HOOT™ v1.1

Introduction

Congratulations on the purchase of your new HOOT™ personal emergency communication device! The HOOT™ is a portable, rugged, power-efficient, and long-range text-based communication solution. It uses LoRa™ radio technology to ensure high performance and proper compliance with regulations. Along with a morse-code interface, your HOOT™ includes WiFi for in-depth configuration and communication. Let's get started!

Power

To power on your HOOT™, plug it in or press the power button. Note that your HOOT™ will always be operational when plugged in, but the power button must be in the "ON" position for the battery to charge.

When powering on your HOOT™, you should hear a Hoot™. There are no lights or other indicators that the device is powered on.

Sending (TX) / Receiving (RX)

Sending is performed via the capacitive button on top of your HOOT™. To send text, use the button as a key to tap out your message in morse code. The message will usually be sent once you are done tapping (see "packet size" for details). By default, you can also tap once to send a Hoot™.

When receiving, your HOOT™ will beep out the received message. You may also send and receive from the WiFi configuration page.

Detailed TX / RX Behavior Specification

There are some particular behaviors to be aware of.

1. Your HOOT™ converts messages from morse code to text, sends them as text, and then converts them back to morse code. As such, it is important that the various TX threshold settings are properly adjusted to your keying speed.
2. When you key messages into your HOOT™, they are normally stored and then sent once you stop keying. However, once a message exceeds the 50 character LoRa packet limit, it is sent immediately. This limit may be set as low as one character, to allow for real-time communication.
3. If you enter an invalid character, a voice prompt will inform you of the error. At this point, any unsent text will be cleared from memory.
4. While powered, your HOOT™ is always able to process incoming messages. If you receive messages while you are keying, your HOOT™ will wait until you are done before it beeps out the queued messages.
5. If you begin keying while your HOOT™ is outputting a received message, it will stop outputting the message and clear it from the output queue. The message may still be viewed in the log.

6. Your HOOT™ will never threaten to stab you.

Entering the setup screen

1. Enable WiFi on your HOOT™, by pressing and holding the top button until you hear a confirmation message. The HOOT™ should now be acting as its own WiFi network.

2. On a computer or mobile device, open the WiFi settings menu and connect to the newly created network. If you do not see the network, try booting your HOOT™ in safe mode (see: safe mode). When in safe mode, the network name is guaranteed to be "HOOT".

3. On some devices, the setup page will appear automatically. If it does not, there may be a prompt to "sign into wifi network". Click this prompt. If there is no prompt, open a browser and navigate to foo.bar (or any other nonexistent address).

4. Change settings on the setup screen, then click "save". You may also view the device log, send messages, or reboot your HOOT™.

5. When finished with the setup screen, press and hold the top button to disable WiFi. Leaving WiFi enabled will quickly drain the battery, and may leave the device vulnerable to attack. Note that your HOOT™ does **not** encrypt WiFi connections.

Settings

Message that triggers a Hoot™

- When this specific message is received, your HOOT™ will Hoot™ instead of beeping. The default is "e", which is equivalent to a single short tap.

Hoot™?

- Whether or not your HOOT™ should Hoot™.

RX Tone frequency (hz)

- The frequency of the beep tone for incoming messages.

Beep out incoming messages?

- Whether to output incoming messages with morse code.

TX Tone frequency (hz)

- The frequency of the beep tone for outgoing messages.

Beep out outgoing messages?

- Whether your HOOT™ should beep when you are keying a message.

Volume

- The main volume setting. This affects beeps, Hoot™s, and voice prompts.

Volume trim settings

- Minor adjustment for Hoot™ and voice prompt volume.

Note: for maximum volume, first configure the main volume setting so that beep sounds are as loud as possible without distorting. Then, adjust the trim settings in a similar fashion.

Alternate Hoot™ sound

- Select between several available Hoot™ sound effects. More may be added in future updates.

RX - Length of a dit (ms)

- This setting defines the morse code speed for incoming messages. All other spacings (length of dash, intra-character, inter-character, etc) are predetermined multiples of the dit length parameter.

TX threshold parameters

- These settings define the morse code speed for outgoing messages, by defining the boundaries between different symbols. For example, assume that "Max length of a dit" is 120ms, and "Wifi enable button hold time" is 3000ms. In this case - a button press shorter than 120ms is a dit, anything between 120ms and 3000ms is a dash, and any press longer than 3000ms will toggle WiFi.

Touch sensitivity

- The calibration parameter for the capacitive button. Refer to the Troubleshooting Procedures section for directions on fixing a miscalibrated button.

Touch debounce spacing

- Another touch calibration parameter. Raise this if the button is "bouncing", or sending multiple inputs when you intend to send only one.

Channel

- This is actually the LoRa "sinc word" value, a number from 0-255. The sinc word is not technically a "channel" - rather, it is a number attached to the beginning of every transmission. Radios with a different sinc word will ignore each other's messages. Thus - the sinc word functions similarly to a channel, but does not prevent interference.

Packet size

- This is the maximum length of text that your HOOT™ will send in a single transmission. At a packet size of 1, your HOOT™ will immediately send every character that you key in. At a packet size of 50, your HOOT™ will wait until you are finished keying your message - unless the message is over 50 characters long. At a packet size of 3, your HOOT™ will transmit every time you key in three characters.

Because the HOOT™ is capable of queuing incoming transmissions, seamless communication is possible with any packet size. Low packet sizes allow for low-latency communication. Large packet sizes allow for slightly smoother operation. For instance - with a packet size of 50, entering an invalid symbol at character #25 will cancel the entire message and allow you to re-enter it without causing confusion for the recipient.

Transmit Power

- The power of the radio, measured in decibels. Note that increasing transmit power does not improve reception, only transmission.

Spreading Factor

- Another LoRa radio property. A higher spreading factor leads to higher range but slower transmission speeds.

WiFi SSID

- The WiFi network name. The new name only takes effect after WiFi is disabled and re-enabled, or when your HOOT™ is rebooted.

Enable WiFi on startup?

- By default, WiFi is disabled when your HOOT™ first turns on. Enabling this setting will automatically enable WiFi when your HOOT™ boots.

Enable repeater mode?

- In repeater mode, your HOOT™ will retransmit every message it receives. This is useful for testing range. However, having two HOOT™s in repeater mode may enter an infinite loop of rapidly sending messages back and forth, interfering with other LoRa devices. For this reason, two safety measures are put in place:

1. Repeater mode does not persist across a reboot.
2. There is a one-second delay before retransmission.

Safe Mode

Safe mode makes several changes to normal operation:

1. Volume, tone frequency, and WiFi network name are reset to their defaults. These changes are temporary, unless saved from the setup page.

2. WiFi is immediately enabled and cannot be disabled via the button.

3. Core functionality - such as sending and receiving messages - is disabled.

The device beeps when the button is pressed (regardless of TX beep setting) but the button does nothing else.

To enable safe mode:

Start with your HOOT™ powered off. Repeat the following procedure at least three times:

- Power on your HOOT™.

- As soon as you hear a Hoot™, power off your HOOT™. If volume is set to zero, you may not hear the boot Hoot™. In this case, wait 1-2 seconds before powering off the HOOT™.

Next, power on your HOOT™. You should hear a message confirming that the device is in safe mode.

Troubleshooting procedures

A. The HOOT™ does not make any sound.

1. Try to boot your HOOT™ in safe mode. If it still does not make sound, something is broken.

2. If the device makes sound in safe mode, check the audio settings. Make sure that TX beep and RX beep are enabled, and that volume is above zero.

B. The HOOT™ does not detect button presses, or thinks the button is always pressed.

1. Boot your HOOT™ in safe mode and enter the configuration page.

2. Adjust the touch sensitivity setting. If your HOOT™ does not beep even when the button is pressed, raise the setting. If your HOOT™ is always beeping, lower the setting.

C. The HOOT™ does not send and/or receive messages.

1. Check that the radio parameters are identical between all HOOT™ units. The channel parameter is the most important.

2. If this does not fix the issue, open the case and verify that the antenna is intact.

If the issue is intermittent, it could be due to interference from other radio emission sources.

D. The battery runs out quickly.

1. Make sure that the "enable WiFi on startup" option is disabled.
2. Reboot your HOOT™.

If the issue persists, it may be due to a software bug. The HOOT" software is designed to enter a power-saving sleep mode automatically, but only after performing extensive checks to make sure it is done processing and will be able to recover from sleep. A wide variety of bugs may cause sleep to never trigger.

E. The HOOT™ is receiving unexpected, garbled messages.

1. There may be other LoRa devices using the same channel. Try switching to a different channel