TRAP MINI 2 MANUAL
V1.0

Model no.: Mini V2

Date: 2025. jan. 9.

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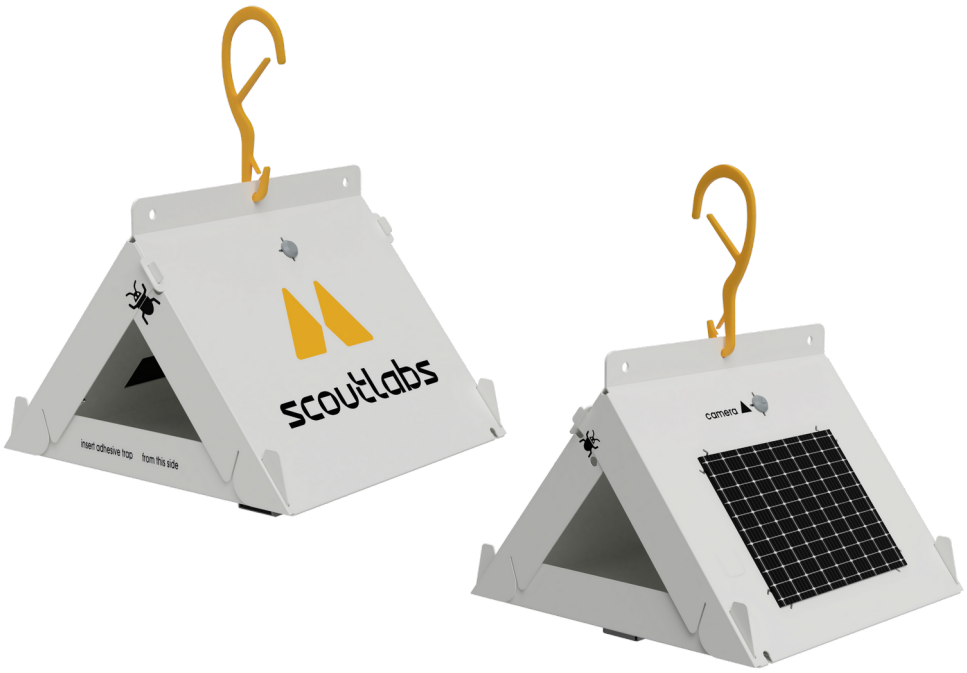
CONTENT OVERVIEW

1. Package contents..... 2
2. Trap assembly.....3
3. Trap setup and operation.....6
4. Status LED color meaning..... 8
4.1. Powered OFF state.....8
4.2. Standby state.....8
4.3. Error state..... 9
4.4. Normal operational processes and states.....9
5. Operational modes..... 11
5.1. Startup modes (Button operation).....11
5.1.1. Normal startup.....11
5.1.2. Debug mode.....11
5.1.3. Flash mode..... 12
5.1.4. Wake up mode.....12
5.2. Normal operation mode..... 13
6. Firmware update..... 14
6.1. USB.....14
6.2. Bluetooth (Not supported).....15
6.3. Over the air (OTA).....15
7. FCC Statement..... 16



1. Package contents

The scoutlabs Mini package includes all components necessary for setup and operation. Verify the following items are included before starting. If any components are missing or damaged, contact customer support.

Included items are the following:

ID	ITEM	DESCRIPTION
1	scoutlabs Mini	IoT sensor, for digital insect monitoring
2	Delta trap	industry standard delta housing which supposed to hold the scoutlabs Mini
3	Plastic hanger	custom plastic tool to hang the delta trap to any kind of crop on the field
4	Binder clip	standard binder clip to hold pheromone in place

It is recommended to retain the packaging materials for off-season storage and transportation to and from the field. Note that the package does not include a sticky sheet or pheromone.

2. Trap assembly

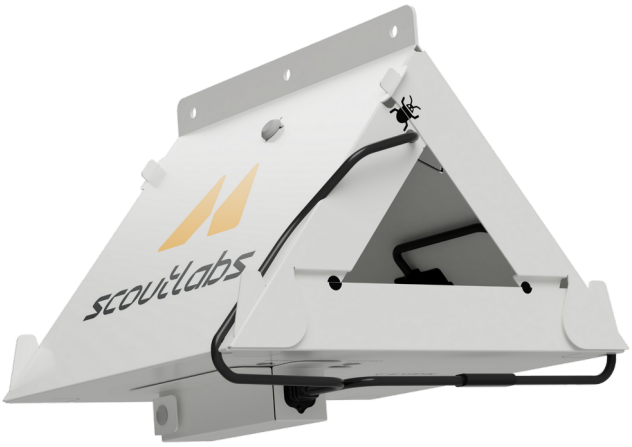
To assemble and install the scoutlabs Mini trap for effective pest monitoring, follow these steps:

- Begin by unfolding the delta trap and ensuring it is clean and free from debris.

- Attach the scoutlabs Mini to the delta trap using the USB Type-C cable coming from the battery box. Secure the device by clipping the two mounting tabs on the top into place.

- Route the cable through the cable guidance holes to keep it properly aligned. This prevents accidental disconnection or damage.

- Insert the sticky sheet into the delta trap from the other side, aligning it with the four positioning tabs. These tabs lock the corners in place, ensuring the entire sheet is visible to the camera for accurate insect capture and monitoring.



- Close the sides of the delta trap by clipping them securely together.

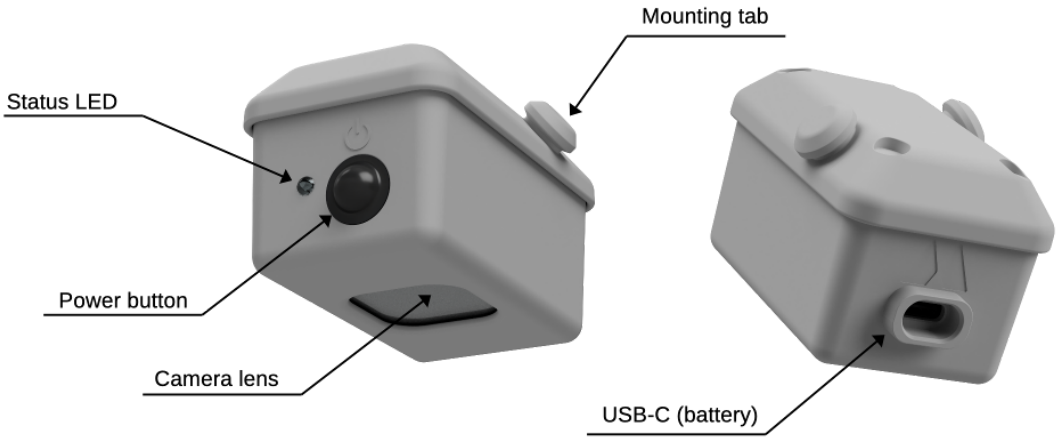
- Connect the solar panel to the battery box, routing the cable through the cable guidance holes to keep it secure and close to the trap body.

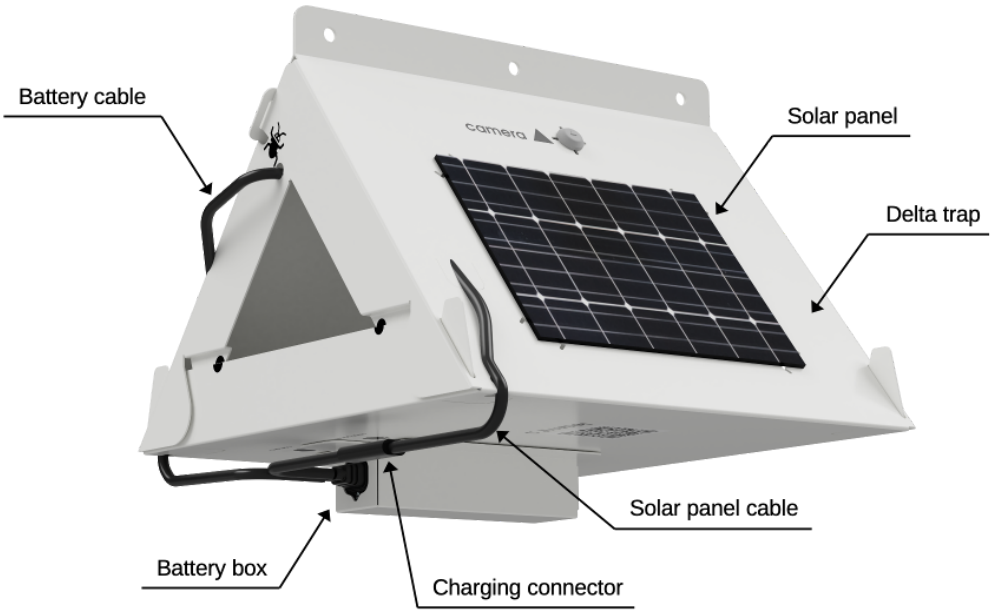
- Finally, insert the plastic hanger into the delta trap to enable easy installation on your field.

For additional visual guidance and more detailed instructions, visit our website: https://scoutlabs.ag/learn/.

3. Trap setup and operation

The scoutlabs Mini is a fairly simple product, consisting of only a few parts. All of the important parts the user should interact with are named below:





The battery should be connected to the scoutlabs Mini via the USB-C connector on the housing, while the solar panel should be connected to the charging connector (USB-C), coming out from the battery box. Operating the trap in normal mode is only recommended, when it is fully assembled, all of the connectors, cables and mounting points fixed.

The scoutlabs Mini can be powered on by pressing the only button on the device, which is called ‘Power button’. Once turned on, the status LED will either blink yellow or display a solid green light, indicating the device’s activation status or working state. Refer to the next section for a detailed explanation of the LED signal meanings.

The user can easily set up the trap by using the ‘scoutlabs’ application which is available to download from the Apple App Store or the Google Play Store. Use the QR code on the left to download the application for your platform. The supported platforms are Android and iOS.

By default, an out-of-the box scoutlabs Mini is deactivated, and the user should add it to their profile and activate it to start the monitoring. After turning on, the user has 5 minutes to communicate with the trap via Bluetooth Low Energy. Have a look at the steps of this process below. This is also guided by the scoutlabs application.

4. Status LED color meaning

The status LED effects indicate different states. It provides information about the current process taking place on the device or the state of the device.

4.1. Powered OFF state

The device is in a powered-off state if the power button is in the off position, or if it is not connected to a power source via a USB cable. The device does not contain an internal battery.

STATUS LED COLOR	LED EFFECT	DESCRIPTION OF STATE
	OFF	If the status LED does not flash even after 10 seconds, the device is definitely in a powered-off state.

4.2. Standby state

The device enters standby state when, after normal operation, the device goes to sleep. The sleep mode can be similar to the powered-off state therefore, the status LED is used to distinguish between the powered-off state and the sleep mode.

STATUS LED COLOR	LED EFFECT	DESCRIPTION OF STATE
	SLOW PULSATING $T_{ON} = 0,16s$, $T_{OFF} = 10s$, $T = \sim 10s$, $f = 0,1Hz$	In **standby** the LED will pulsate in every 10 seconds. **The color is depending on the battery level, if OK**.
	SLOW BLINKING $T_{ON} = 0,07s$, $T_{OFF} = 10s$, $T = \sim 10s$, $f = 0,1Hz$	In **standby** the LED will pulsate in every 10 seconds. **The color is depending on the battery level, if too low**.

4.3. Error state

Error indicator status LED behavior.

STATUS LED COLOR	LED EFFECT	DESCRIPTION OF STATE
	FAST BLINKING 30s	In **any mode**, if an error occurs, the status LED switches to this mode. It indicates that some error has occurred. After this state, the device goes to sleep. **During normal operation, after an error state indication, the device goes to sleep (standby mode).**

4.4. Normal operational processes and states

STATUS LED COLOR	LED EFFECT	DESCRIPTION OF STATE
	SOLID	In **normal working mode**, solid green means that the device is started just recently, and currently booting. In the first 5 minutes, the user is able to connect to the device via Bluetooth or USB. After that, a normal working cycle will happen.
	FAST BLINKING $T_{ON} = 0,15s$, $T_{OFF} = 0,45s$, $T = 0,5s$, $f = 2Hz$	In **normal working mode** this means that the device initialises the peripherals, and taking photo, do measurements, turning on the communication module etc. While it is blinking, the user can be sure that the microcontroller is currently interacting with the peripherals
	SLOW BLINKING $T_{ON} = 0,75s$, $T_{OFF} = 1,25s$, $T = 2s$, $f = 0,5Hz$	In **normal working mode**, if an upload takes place, slow blue blinking LED means the device actually **trying to connect to the mobile network**.
	SLOW SHORT BLINKING $T_{ON} = 0,20s$, $T_{OFF} = 1,80s$, $T = 2s$, $f = 0,5Hz$	In **normal working mode**, if an upload takes place, slow blue blinking LED means the device actually trying to search **geolocation** coordinates.
	FAST BLINKING $T_{ON} = 0,15s$, $T_{OFF} = 0,15s$, $T = 0,3s$, $f = 0,3Hz$	In **normal working mode** this means that the device is currently **uploading or downloading** data to/from our cloud server.

	FAST BLINKING $T_{ON} = 0,16s, T_{OFF} = 0,34s,$ $T = 0,5s, \ f = 2Hz$	In **normal working mode**, yellow flashing LED means that there is an OTA download is in progress, the device is downloading the new firmware from our cloud.
	SOLID	In **normal working mode, or debug mode**, solid yellow color indicates that we now have the new OTA firmware binary, and currently writing it to flash memory. After this, the device will restart itself.
	SOLID	Cyan color means that the device is in **reprogramming / reflash mode**. This allow the user to easily reflash a firmware onto the unit.
	SOLID	Solid purple means that the device is in **debug mode**. Debug mode is exactly the same as normal working mode, but without the 5 min possibility in the beginning to connect to the device. So after a quick, few seconds solid purple, the device will continue the normal working cycle
	FAST BLINKING $T_{ON} = 0,15s, T_{OFF} = 0,45s,$ $T = 0,5s, \ f = 2Hz$	This means that the any of the **test modes** are active on the device. Id a test mode is activated on the device, it will blink purple during the whole run. In the end, the device evaluates the self test, and blink green if it is passed, and blink green if it failed.
	FAST BLINKING $T_{ON} = 0,15s, T_{OFF} = 0,45s,$ $T = 0,5s, \ f = 2Hz$	After a normal startup, if the status LED blinks in this mode, it means that the device has not yet been activated. Activation can be done via the application on a phone using Bluetooth.

5. Operational modes

5.1. Startup modes (Button operation)

The device can be started in three modes. This can be controlled by the number of power cycles with **power button**. The power cycles must be completed within 5 seconds.

5.1.1. Normal startup

The normal start can be achieved by a single power-on. In this mode, it is possible to connect to the device via USB cable or Bluetooth.

STATUS LED COLOR	LED EFFECT & STATE TIME	DESCRIPTION OF STATE
	OFF 🕒 -	
▼	**Single power-on.**	
	SOLID 🕒5m	In normal working mode, solid green means that the device is started just recently, and currently booting. In the first 5 minutes, the user is able to connect to the device via Bluetooth or USB. After that, a normal working cycle will happen.
▼		
NORMAL OPERATION MODE		The device then executes the normal operation process.

5.1.2. Debug mode

The debug start can be achieved by a double power-on. Debug mode is exactly the same as normal working mode, but without the 5 min possibility in the beginning to connect to the device.

STATUS LED COLOR	LED EFFECT & STATE TIME	DESCRIPTION OF STATE
	OFF 🕒 -	

▼	**Double power-on.**	
	SOLID 🕒2s	Solid purple means that the device is in debug mode. Debug mode is exactly the same as normal working mode, but without the 5 min possibility in the beginning to connect to the device. So after a quick, few seconds solid purple, the device will continue the normal working cycle
▼		
NORMAL OPERATION MODE		The device then executes the normal operation process.

5.1.3. Flash mode

The flash mode start can be achieved by a triple power-on.

STATUS LED COLOR	LED EFFECT & STATE TIME	DESCRIPTION OF STATE
	OFF 🕒 -	
▼	**Triple power-on.**	
	SOLID 🕒 -	Cyan color means that the device is in reprogramming / reflash mode. This allow the user to easily reflash a firmware onto the unit.

5.1.4. Wake up mode

STATUS LED COLOR	LED EFFECT & STATE TIME	DESCRIPTION OF STATE
	SLOW PULSATING 🕒 Waiting for next wakeup	
▼	**Wakeup time.**	
NORMAL OPERATION MODE		The device then executes the normal operation process.

5.2. Normal operation mode

The following flowchart illustrates the normal operational mode. The possible initiation methods for the normal operational process will be described later in this document.

STATUS LED COLOR	LED EFFECT & STATE TIME	DESCRIPTION OF STATE
ANY STARTUP MODE		
▼		
	FAST BLINKING 30s-2m	In normal working mode this means that the device initialises the peripherals, and taking photo, do measurements, turning on the communication module etc. While it is blinking, the user can be sure that the microcontroller is currently interacting with the peripherals.
▼		
	SLOW BLINKING 1m-15m	In normal working mode, if an upload takes place, slow blue blinking LED means the device actually trying to connect to the mobile network or or trying gets coordinates from satellite network.
▼		
	FAST BLINKING 1m-3m	In normal working mode this means that the device is currently uploading or downloading data to/from our cloud server. **If a new firmware version is available on the server, the device will switch from this state to a fast blinking orange state and begin downloading the new firmware. (OTA)**
▼		
	SLOW PULSATING Waiting for next wakeup	Standy state If the device is finished the normal working cycle, it will go to standby. In standby the LED will pulsate in every 10 seconds. The color is depending on the battery level, if OK, it is GREEN, if too low, it is RED

If any error occurs in the process, the device enters an error state.

STATUS LED COLOR	LED EFFECT & STATE TIME	DESCRIPTION OF STATE
	FAST BLINKING 30s	Error state In any mode, if an error occurs, the status LED switches to this mode. It indicates that some error has occurred. After this state, the device goes to sleep.

6. Firmware update

The device firmware can be updated in three ways. The following will demonstrate this. It is important that with none of the methods do we directly flash the firmware onto the device. Instead, we copy the binary file to the device's storage using any of the methods, and then the device will flash itself.

6.1. USB

For this method, we need to have the firmware.bin file on our computer and an USB-C data cable. At the 1. step, connect the computer to the TRAP Mini 2 and turn on with a normal mode start. After this, the device will be in the following state:

STATUS LED COLOR	LED EFFECT	DESCRIPTION OF STATE
	SOLID 🕒-	In normal working mode, solid green means that the device is started just recently, and currently booting. In the first 5 minutes, the user is able to connect to the device via Bluetooth or USB. After that, a normal working cycle will happen.

If the computer recognizes the device, then the 5 minute time in this state is not applicable. If the connection is successful, the device storage will appear on the computer. As the 2. step, copy the *firmware.bin* file from the computer to the device's storage. This can take up to 1 minute. If the file has been successfully uploaded to the device, the third step is to start the device in debug mode. **When the device starts, it detects that the *firmware.bin* file is on the storage, and begins to flash itself.** The status LED will be as follows:

STATUS LED COLOR	LED EFFECT	DESCRIPTION OF STATE
	SOLID 🕒2s	Solid purple means that the device is in debug mode. Debug mode is exactly the same as normal working mode, but without the 5 min possibility in the beginning to connect to the device. So after a quick, few seconds solid purple, the device will continue the normal working cycle
▼		
	SOLID 🕒30s	In **normal working mode**, solid yellow color inidcates that we now have the new OTA firmware binary, and currently writing it to flash memory. After this, the device will restart itself.

If the device has finished the flash process, it will restart itself, now with the new firmware version.

6.2. Bluetooth (Not supported)

This is not yet available in the current mobile application. As the first step, the device must be turned on with a normal mode start. In later versions, this also be available.

6.3. Over the air (OTA)

With this method, no human intervention is needed. Here, the device independently obtains the new firmware version from the server and then flashes itself. This can be done once the device has completed the network connection process and has requested the configuration file from the server. If a new firmware version is available, the device statuses will be as follows:

STATUS LED COLOR	LED EFFECT	DESCRIPTION OF STATE
	FAST BLINKING 🕒1m	In normal working mode this means that the device is currently uploading or downloading data to/from our cloud server.
	FAST BLINKING 🕒5-15m	In **normal working mode**, yellow flashing LED means that there is an OTA downloar is in progress, the device is downloading the new firmware from our cloud.
	SOLID 🕒30s	In **normal working mode**, solid yellow color inidcates that we now have the new OTA firmware binary, and currently writing it to flash memory. After this, the device will restart itself.
NORMAL OPERATION MODE		The device then executes the normal operation process.

If the device has finished the flash process, it will restart itself, now with the new firmware version.

FCC Statement

1. This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions
   (1) This device may not cause harmful interference.
   (2) This device must accept any interference received, including interference that may cause undesired operation.

2. Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

   Note: This equipment has been tested and found to comply with the limits for a class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation.

   This equipment generates uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions,may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:
   - Reorient or relocate the receiving antenna.
   - Increase the separation between the equipment and receiver.
   - Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
   - Consult the dealer or an experienced radio/TV technician for help.
   -

The device has been evaluated to meet general RF exposure requirements. This equipment should be installed and operated with a minimum distance of 20 cm between the radiator and your body.