CRITTER SOLUTIONS

Multi-Trap™ SOP v1.3 (Early Adopter)

The Critter Solutions (CSL) Multi-trap™ is a fully automated trapping system design for mammalian pest control. It has been tested under the NAWAC guidelines for mice, ship/black rats, Norway/Brown rats, stoats, ferrets and possums. As such, it should only be used to target these species (noting that additional pest species might be added by CSL at a later date).

The Multi-trap incorporates either an IoT cellular modem or IoT satellite modem for real-time transmission of trap triggers images and data to the Flexi-Comms™ Website. If you are using this feature, you will be provided with a login for an account to access the website.

The Multi-trap uses high speed image collection and AI onboard the trap to detect and classify interacting species. If the AI identifies a target pest species it will automatically trigger the trap. **While the use of AI is designed to reduce the risks of control activities to non-targets, no AI system can be guaranteed to be 100% accurate and traps should still be used and deployed with careful consideration, particularly in areas where they may be non-target or safety concerns.**

Figure 1: A CSL Multi-trap

NB: At no time should any person ever stick a foreign object or limb into the trap area. The trap contains high-powered springs to create significant crushing force on the kill bars when triggered. CSL is not responsible for any injury or damage which may occur should this instruction be ignored.

1. Purpose

This SOP outlines safe, ethical, and effective procedures for the deployment and use of the Critter Solutions Multi-trap (CSL Multi-trap) in pest management programmes across New Zealand.

2. Pest target species

The CSL Multi-trap is designed for lethal control of the following pest species:
• Mice (*Mus musculus*)
• Ship rats (*Rattus rattus*)
• Norway rats (*Rattus norvegicus*)
• Stoats (*Mustela erminea*)
• Ferrets (*Mustela furo*)
• Possums (*Trichosurus vulpecula*)

The AI is trained to identify and activate only for when it detects these species (unless you have specifically instructed CSL on a bespoke target list with some of these targets excluded). Other pest species may be added to the target list at the discretion of CSL.

3. Non-Target Species and Risks

Although the Multi-trap uses AI to avoid non-target activation, certain risks remain due to the non-zero chance of mis-classification of a non-target interaction as a pest target. Operators must take proactive steps to reduce the likelihood of harm to domestic animals, native birds, and the public.

Key mitigation include:

1. Never put your hand or other foreign object into the mouth of the trap
2. Do not deploy within 50 m of homes or public tracks/roads.
3. Do not place traps where children or pets can gain access.
4. Mount traps on sturdy trees/posts, at a height suitable to allow carcasses to readily drop out.

Avoid areas frequented by ground-dwelling birds or discuss methods to mitigate their interactions with CSL.

5. Provide warning signage in public areas e.g. “Automated pest control – do not touch”
6. Update to the latest trap firmware and AI species model before each deployment.
7. Never carry the trap by putting your hand in the kill bar area.

4. Pre-Deployment Assessment

Before installation, conduct a site and target assessment considering target pests, non-target risks, habitat type, access and servicing, communications, and environmental exposure.

A recommended pre-deployment checklist is provided in at the end of this document. This checklist should be completed on deployment of each trap.

5. Mounting bracket and trap attachment.

The Multi-trap comes with a steel mounting bracket, which can be affixed to a post or tree with strops or screws. The mounting bracket is designed to be robust to avoid the trap being rotated or displaced (particularly following an activation).

The height at which the trap should be set should be determined as part of the Pre-Deployment Checklist, and reasonable measures taken as outlined in that checklist to avoid non-targets and human interference.

The height at which you set your trap must be carefully considered during the Pre-deployment checklist. Consider the following factors:

- The trap must be set at a height or slope that allows for target animal carcasses to freely drop away.
- If possums are a selected target species we recommend placing the trap entrance at a minimum of 500mm off the ground.
- If the area is frequently used by ground dwelling birds which may remove lures and interfere with traps, we recommend a height of 500mm, with either a wooden or natural ramp (see Figure 3 for an example), to encourage easy target (but not non-target) entry. Ramps made from natural sources (e.g. logs/branches) are attractive to pests.
- The trap should be angled no more than 30 degrees, to ensure good lure flow from the in-built lure dispenser.

To secure the trap to a tree/post, use the bracket provided and follow steps 1 – 3 below.

1. Attach bracket to tree using the single top hole. Temporarily attach the trap over the bracket and ensure the height is where you want it. Alter if required.
2. Once height is set drill screws into all three backet holes.
3. Attach the trap to the bracket and then drill a screw through the final remaining hole. This prevents the trap from jumping off the bracket during a trigger activation

Figure 2: Attaching a bracket prior and CSL Multi-trap to tree or post.

Figure 3: Example o a natural ramp to encourage rat and stoat interactions on a raised trap deployment. A ramp can also be fitted to the base of the trap, using the holes provided (circled in red in image).

6. Installing and replacing the EzyLure cannister

The Multi-Trap has an in-built EzyLure unit for dispensing fresh liquid lure automatically twice per day. A 150 ml cannister will nominally last around 6-12 months. The EzyLure syringe canisters can be unscrewed and replaced if lure needs replenishing.

7. Checking and servicing lure tray

The Multi-trap has a removable tray to enable other lures/foods to be placed into the trap.

The lure should only ever be checked and serviced while the Multi-trap is turned off and the kill bar is down. Never access the lure by putting your hand (or any other object) into the trap. The lure tray is easily accessed via the outside of the trap, as per the images in Figure 4 and outlined below:

1-2 Move the metal tab backwards so that the tray can be removed.

3. Remove the metal lure tray. Additional lure can be placed on this tray, including being cable tied in using the small slots provided. Replace the bait tray carefully into the trap so it fits into the slots on the other side. Shut the metal latch is hold the bait tray in place.

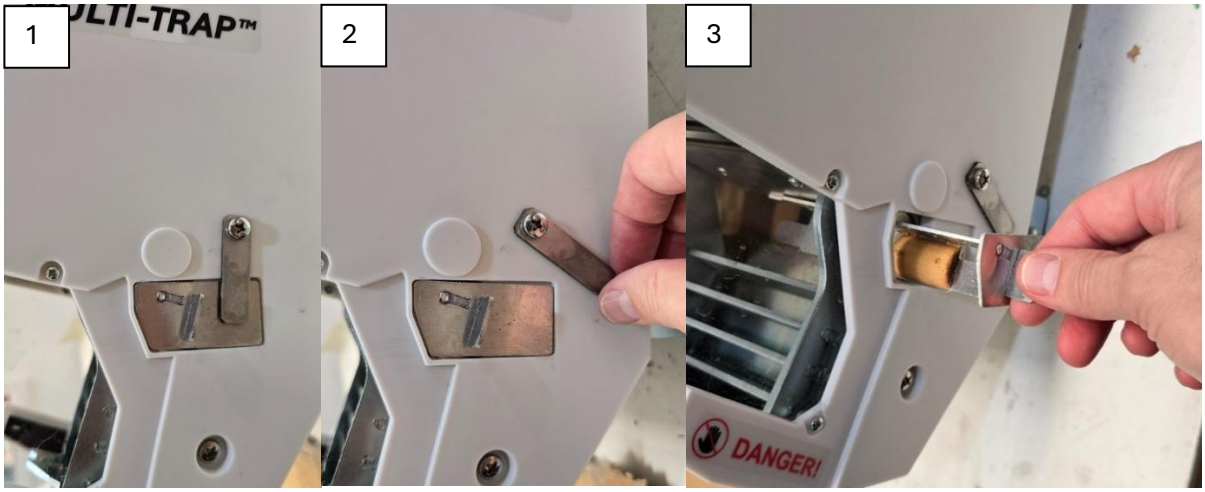
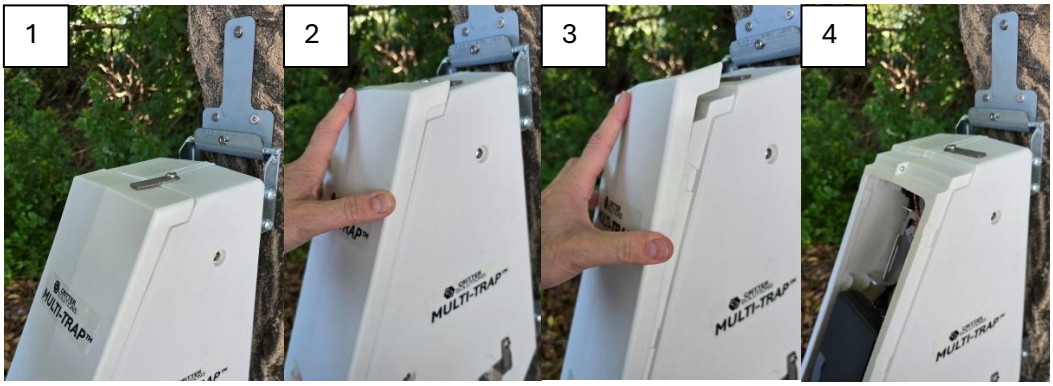


Figure 4: Accessing the lure tray should only be done via the outside of the trap. The metal tab should be moved sideways after which the tray can be taken in and out.

8. Removing trap lid and battery attachment.

To remove the lid and access the trap switches and batteries, follow the following steps:

1. Move the metal tab (circled in red) which holds the lid in place.
2. Pull the lid gently upwards and outwards (images 2 and 3) to remove it.
4. The internal components of the trap are now accessible.



To put the lid back on:

1. Place the lid on as shown in image 1, using the plastic guides on the trap
2. Firmly push the lid onto the trap
3. Push the lid down, so that it sits flush with the top of the Multi-trap
4. Move the metal tab over the lid, to hold it in place.

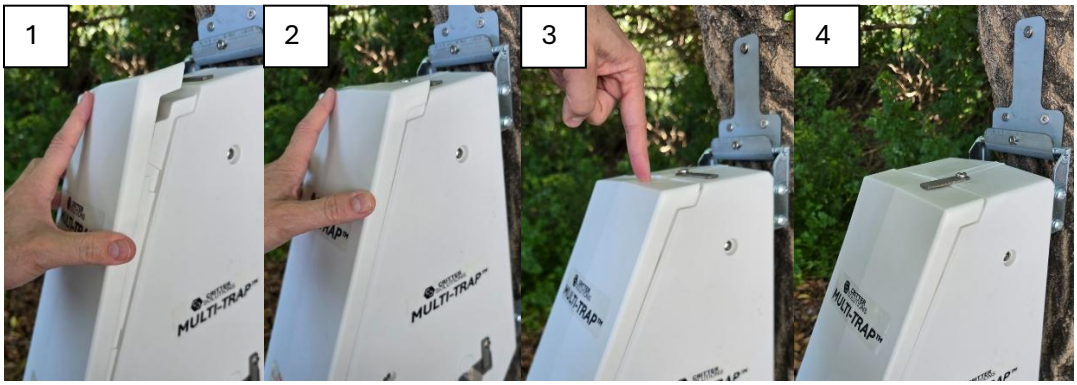


Figure 5: Removing the lid from the Multi-trap.

For the battery packs, ensure each back has 6 fully-charged Eneloop AA batteries prior to deployment. The battery packs are then fitted into the trap as follows (Figure 6):

1. Battery backs should fit together so that the yellow dots form a whole circle.
2. Place one battery pack in the trap as shown in (2), with the plastic tab of the battery pack pointing to the top of the unit.
3. Place the second battery pack in to form a whole circle.
4. Battery packs are then plugged into the trap as per the picture in Figure 7 and the trap will turn on. Make sure the battery wires are not sticking out of the trap or catching on any other components.

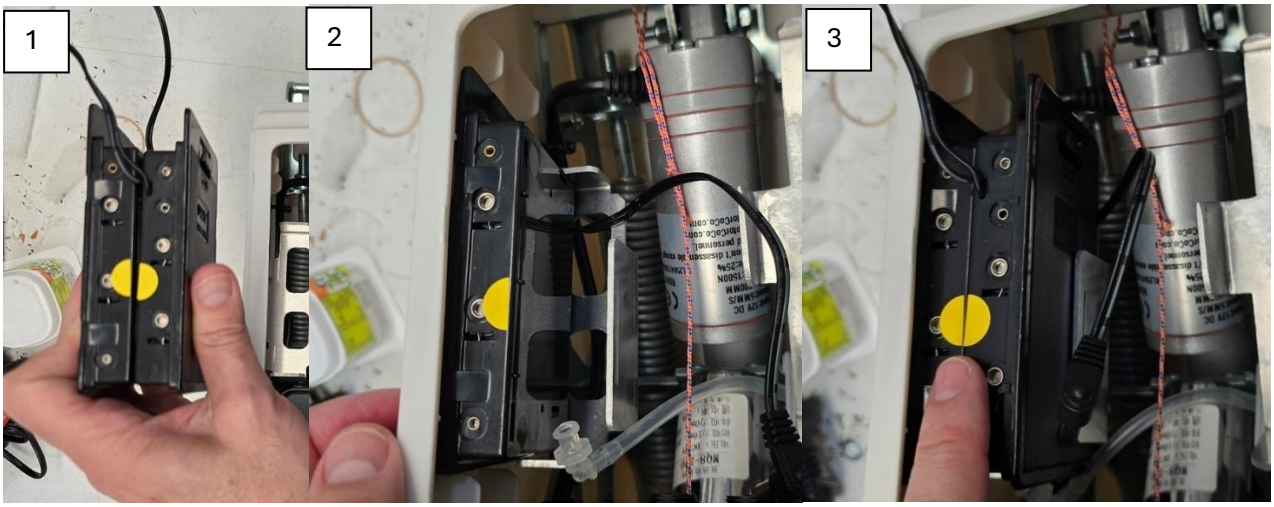


Figure 6: Fitting the battery packs inside the Multi-trap.

Figure 7: Batteries are plugged into the trap area as shown n the red circle.

9. Trap Usage

9.1 Initial start up (typical usage, with no firmware update)

The trap will automatically start up when both power jacks are plugged in to the trap (with charged batteries).

The top LED light will start off being GREEN for 3-5 seconds while the trap tests and configures itself. When the trap is ready for user input, the LED light will turn BLUE. From here you can:

- Pressing the TEST COMMS button once to initiate a comms connection, and the unit will attempt to post a message to the website. This can take several minutes, depending upon the connection. The LED will turn WHITE during this process.
- Pressing and hold the DISPENSE LURE button to manually pump lure onto the wooden block on the bait tray.
- Set the unit into KILL MODE by pressing the KILL MODE button once. The LED will flash RED to indicate it is arming itself. When the arm is raised, the light will go green when communicating with the website, then turn off when complete
- DISARM the trap by pressing the DISARM button once. The LED will turn CYAN to indicate it is disarming (lowering the kill bar to a safe position).

After 30 seconds, the unit will automatically *enters the last mode that it was set to*. E.g., if the trap was in kill mode prior, it will automatically enter kill mode again. If the trap was disarmed prior, it will stay disarmed.

When the KILL MODE button is pressed (and the LED turns RED), the trap will automatically raise the kill bar. Once the arm is raised it will latch into position and the trap motor will internally draw itself back. This whole process will take around a minute. Once the trap has armed itself, it will log into the Flexi-comms network (if enabled) and post a startup message. This can take several minutes, depending upon the connection to the network. Once this is completed (or skipped) the LEDs will turn off, and the trap is now live.

Note: at ANY stage during kill-bar movement (up or down), pressing any of the buttons will STOP the kill bar moving. You can either resume entering kill mode by pressing the KILL MODE button again, or lower the bar by pressing the DISARM button.

9.2 Manual kill-bar release cord

There is a manual release cord to trigger the trap (see Figure 6, centre image). **This is tied directly to the solenoid that releasing the kill bars, which will immediately 'trigger' the kill bars when the cord is pulled.** This should only be used when the kill bars need to be lowered but the trap is unable to do so (e.g., trap failure, and the trap needs to be moved). Repeated release of the kill bars in this 'dry fire' condition may mechanically damage the trap to the high impact forces experience by the frame when there is no pest present in the trap.

9.3 Checking the trap after deployment

If the trap is powered up and the LEDs are all OFF, then pressing any button will wake the unit up. The LED will turn blue, indicating that the trap is read of user input. Follow the process in Section 9.1 above (Initial start up) to test/configure the trap.

9.4 Updating the firmware

Power off the unit, insert the SD card with the trap update files, and power on the unit. The LED will turn green, then white or yellow to indicate an update is occurring. This can take several minutes. When the update is completed, the LED will turn BLUE, indicating that the trap is read of user input. Follow the process in Section 9.1 above (Initial start up) to test/configure the trap.

Figure 8: Indicator LED lights, showing 1) processing light 2) blue light ready or input and 3) the red light when the trap is set to kill mode.

10. Indicator LED

LED Colour	**Meaning**
Green	The unit is awake and internally processing (no user input accepted)
Blue	The unit is awake and awaiting instructions from the user. The unit will timeout after 30 seconds and enter its last know mode (e.g., KILL MODE, or DISARM mode)
Red when KILL MODE button is pressed	Unit is entering KILL MODE
Cyan	Unit is DISARMING
White	The unit is attempting communication with the Flexi-comms website, OR the unit is updating firmware
Yellow	The unit is updating the AI firmware/model
Flashing red on startup or when NOT entering KILL MODE	Unit error, including unable SD card error

1. Kill bar positioning

When the trap is active and powered on the kill bar will be raised as in Figure 9.

Figure 9: Kill bar positioning in the Multi-trap 1) kill bar is up and trap is set, and 2) kill bar is disarmed and safe to handle.

After a trigger has occurred, the kill bars will remain clamped down for 10 minutes, before automatically opening again to release the animal. If a cellular functionality is enabled, the trap will send 3 images: the image it triggered on for animal ID; and image of the trap immediately after triggering; and an image of the trap after it has self-reset the kill bar (should be empty).

12. SD card

The Multi-trap come with a microSD card for data storage. The microSD card contains images and various supporting files to enable Critter Solutions to evaluate and improve the performance of the units from field data. The SD card also enables new updates and AI models to be pushed out. The trap **WILL NOT FUNCTION** if the SD card is not inserted or detected. The LED will flash RED to indicate an SD card error.

Each time the unit is started up a new session folder 'SESSXXXXX' folder is created on the SD card, with all images stored sequentially as they are captured. If a unit is powered up and powered down without any triggering, then the SESSION folder will contain a system log file, but no images.

Also, a folder called '_Detections' is created which will contain sub-folders of animals/items detected, and a copy of images with detected animals in them. These folders will be continuously added to over time. If

the folders become too large (several thousand images) then the data should be copied off, and the folders deteled from the SD card, otherwise the trap will take long to power off after an interaction due to longer write times.

13. Deactivation and Retrieval

Disarm traps before removal by pushing the ‘Disarm’ button. Once the trap arm is fully lowered the batteries can be unplugged. Clean the trap, recharge batteries, and store trap safely. Dispose of organic material responsibly.

14. Automatic shutdown

The Multi-trap will automatically enter low-power mode to help preserve the long-term functionality of the batteries, when the battery pack voltage falls below 10V. If connected to the cellular network, the unit will send a low-battery notice to the Flexi-Comms website when the voltage falls below 11V.

15. GPS location and status reports

The Multi-trap attempts to acquire a GPS signal before it checks in for its first status report (6 hours after startup, by default). It can take several minutes and is only done once, after startup. If a GPS location is acquired, it will report its position with each data upload to the Flexi-Comms website.

The units are set to check in once every 6 hours (the default value) to the Flexi-Comms website. This check in will report various details such as battery voltage, temperature, and GPS location (if successfully acquired) and any errors that the unit detects.

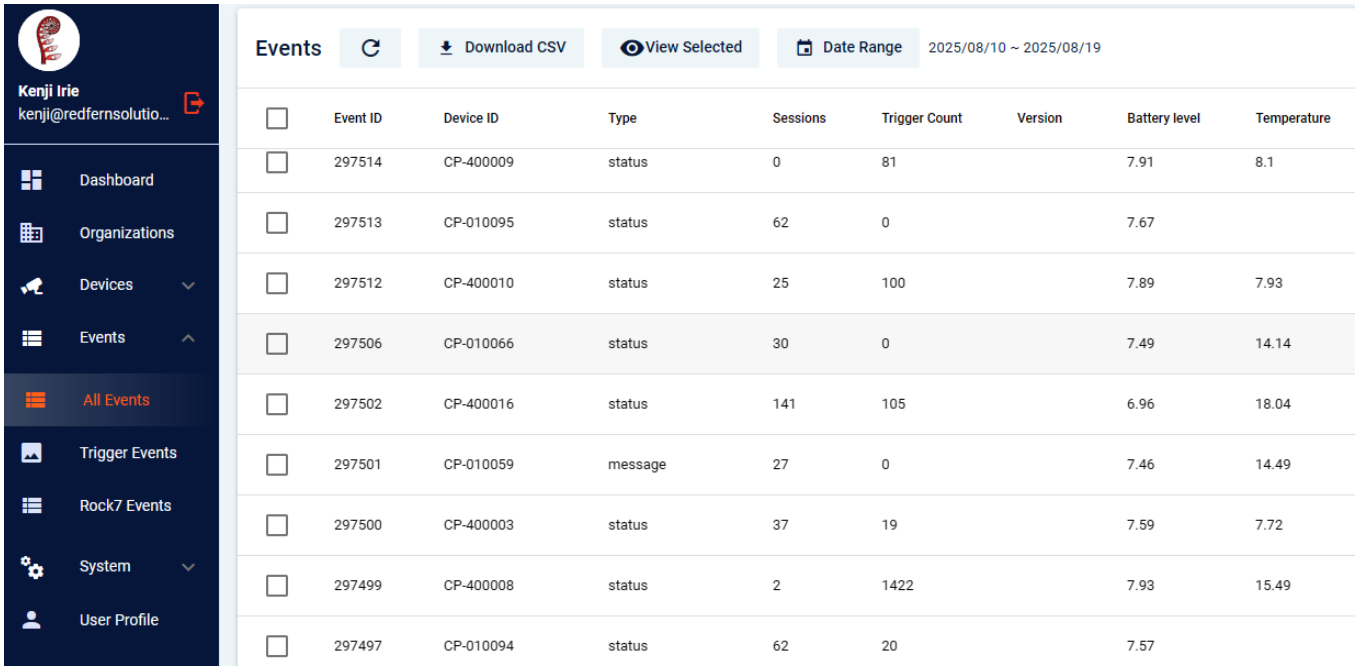


Figure 10: A screenshot of the 'All Events' tab showing the status reports and messages from deployed units.

16. Battery Longevity

The operational lifetime of the unit on AA batteries depends upon the number of battery packs used, the capacity and charge state of the batteries, the usage of cellular modem, the number of triggers (interactions) that occurs with the camera, and the configuration of the unit firmware.

With the production units being released at the time of writing this version of the SOP, we are still establishing and optimizing the battery performance of the units.

Currently, this is what we are expecting (pending testing of various configurations), with the unit operating 24 hours per day:

- In areas with high interaction rates (e.g., 30 per day) with cellular data enabled, the batteries may last 6-10 weeks (TBC).
- In areas with low interaction rates (e.g., 5 per day) with cellular data enabled, the batteries may last 8-12 weeks (TBC).

Disabling the cellular modem will reduce power consumption, and potentially add a further week or two to the lifetime of the units.

17. Troubleshooting - Unit isn't uploading to the https://critterpic.flexi-comms.com website

If the unit is not sending data to the website, reasons can include:

- Unit has low batteries
- For terrestrial modem units, the unit is out of IoT cellular reception
    - *Note: This differs to your cell phone voice/data connectivity*
    - Bad weather could affect network connectivity in some cases
- The SIM has been disabled

The unit is not power up after the power jacks are plugged in:

- Check the battery charge, and also that the batteries are properly inserted. On occasion, some batteries do not for a good connection with the spring contacts, and moving the batteries in the holder can help create a good contact
- Ensure that the unit is allowed to power down for at least 15 seconds before repowering the unit. The unit is very low power and residual power inside the electronics can power the unit for some time. You can also remove power from the unit, then hold the DISPENSE LURE BUTTON for 2 seconds to drain the electronics of residual power, before plugging the battery jacks in again.

18. Cleaning and maintenance

The Multi-traps may need cleaning from time to time. Please clean exterior surfaces with a damp cloth, and do not use any harsh or abrasive chemicals. Soap or gentle dishwash will remove most grime and buildup.

19. Safety and Compliance

Use only by trained operators. Comply with NZ Animal Welfare standards, Health & Safety at Work Act, and local authority permissions. Avoid areas accessible to children or pets.

20. Contact and Support

Critter Solutions Ltd.
Email: info@crittersolutions.co.nz
Website: www.crittersolutions.co.nz

21. Review and Updates

This SOP will be reviewed on a regular basis and as AI models evolve. Users must implement updated practices immediately upon release.

22. Technical specifications/default settings

Tables [TBC]

Specification	**Value**
Battery pack requirements	12xAA cells
Terrestrial cellular modem (optional)	Nordic nRF9160, LTE CAT-M1
Satellite cellular modem (optional)	Quectel EG21G, LTE CAT 1

SD card compatibility	SDHC (not all cards may work)

The setting below are subject to change from time to time as feedback is acquired from end users.

Setting	**Default value**
GPS location	Enabled when cellular comms is enabled
Cellular communications	Enabled
Status reporting	Every 6 hours when cellular comms is enabled

Change log

12/11/2025: Version v1.0
19/12/2025: Version v1.1. Added in reference to the manual pull cord (inserted Section 9.2)
20/03/2026: Version 1.2. Corrected the LED light description for recent firmware changes.
28/10/2026: Version 1.3. Updated with satellite modem details.

Critter Solutions Ltd. – Multi-trap Pre-Deployment Checklist

This checklist must be completed prior to the deployment of any CSL Multi-trap. It ensures correct site selection, non-target safety, and technical readiness.

1. Site Information

Site name / ID: _____ GPS / Map reference: _____

Habitat type: ☐ Forest ☐ Farmland ☐ Urban ☐ Coastal ☐ Wetland

Access routes safe? ☐ Yes ☐ No

Landowner permission obtained? ☐ Yes ☐ No

Public signage required? ☐ Yes ☐ No

2. Target Pest Assessment

Target species confirmed: ☐ Mice ☐ Ship rats ☐ Norway rats ☐ Stoats ☐ Ferrets ☐ Possums

Evidence of pest activity present? ☐ Yes ☐ No (describe: _____)

Pest density estimate: ☐ Low ☐ Medium ☐ High

Seasonal timing appropriate? ☐ Yes ☐ No

3. Non-Target Risk Evaluation

Native wildlife present? ☐ Yes ☐ No (species observed: _____)

Domestic animals nearby? ☐ Yes ☐ No

Mitigation measures (tick all that apply): ☐ Mount trap ≥300 mm ☐ Mount trap >500mm ☐ Use ramp ☐Use signage ☐ Restricted access area (e.g. mesh fencing)

Distance from dwellings/public areas >50 m? ☐ Yes ☐ No

Area free of children/pets? ☐ Yes ☐ No

4. Environmental Conditions

Weather exposure acceptable? ☐ Yes ☐ No

Vegetation cleared around trap entrance? ☐ Yes ☐ No

Mounting surface stable (tree/post)? ☐ Yes ☐ No

Hazard risks checked? ☐ Yes ☐ No

5. Technical & System Checks

Latest firmware updates installed? ☐ Yes ☐ No

Trap registered in dashboard? ☐ Yes ☐ No

Power supply checked (battery voltage)? ☐ Yes ☐ No

Lure system filled and operational (if using)? ☐ Yes ☐ No

Network connectivity test passed (if using)? ☐ Yes ☐ No

Camera lens clean? ☐ Yes ☐ No

Arming test successful? ☐ Yes ☐ No

6. Team & Documentation

Operator name(s): _____

Training verified? ☐ Yes ☐ No

Health & Safety briefing completed? ☐ Yes ☐ No

Data recording tools ready (app/paper)? ☐ Yes ☐ No

Emergency contact plan confirmed? ☐ Yes ☐ No

7. Final Pre-Deployment Sign-off

Role	Name / Signature	Date
Lead Operator	_____	_____
Supervisor / Project Manager	_____	_____
Landowner / Stakeholder (if applicable)	_____	_____

All checklist items must be completed before arming the trap.