Warranty and Service

Warranty
The Manufacturer's Warranty documentation is available by email request from support@reconrobotics.com

Updated Manuals and Translations
For the most current version of this manual, along with all available translations of this manual, please visit our website at www.reconrobotics.com

To Request Service or Repairs
Call or e-mail your ReconRobotics representative or reseller to describe the problem you are experiencing and request a Return Material Authorization (RMA) tracking number. In addition to your original sales receipt, you will need to provide the unit's serial number, your return shipping address, email address and a daytime telephone number.

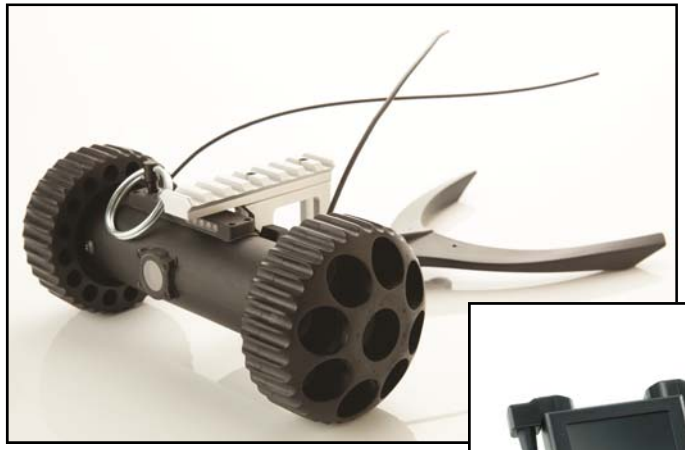
ReconRobotics, Inc
5251 W 73rd Streeet, Ste A
Edina, MN 55439
Phone: 1-866-697-6267 or 952-935-5515
Fax: 952-935-5508
Website: www.reconrobotics.com

For customer service, call 866-398-1921
Or email support@reconrobotics.com

Saving Lives at the Tip of the Spear™

RECON SCOUT®

Know Before You Go®



Recon Scout CT User Manual

Version 1.2 November 2016

RECON ROBOTICS™

R001459

Product Identification

This manual applies to the ReconRobotics Recon Scout® CT and OCU II.

Notice:

Changes or modifications not expressly approved by ReconRobotics could void the user's warranty and could void the user's authority to operate the equipment.

Corporate Headquarters:

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Place Serial Number Sticker Here

The devices described within this manual are protected under one or more of the following US Patents: 7,559,385; 8,505,230; 9,061,544; D626,577; and other patents pending.

- Lithium Polymer batteries are volatile. Only charge the robot and OCU II with chargers provided by ReconRobotics. Failure to do so may cause fire, which could result in personal injury and/or property damage.
- By purchasing a robot kit from ReconRobotics, the buyer assumes all risks associated with lithium polymer batteries. If you do not agree with these conditions, please return the robot kit to ReconRobotics.
- Do not attempt to disassemble or modify the robot or OCU II. This may cause an electric shock, fire, or system failure.
- Do not insert any foreign objects inside the robot or OCU II. This may cause electric shock, fire, or system failure.
- Do not immerse the OCU II or chargers into water or liquids.
  - If water or any liquid enters the inside of the OCU II, immediately stop use to avoid electric shock, fire, or system failure.
- The following describes additional symptoms of a device that needs technical attention and should not be used:
  - After a full charge, the OCU II display intermittently turns ON and OFF.
  - The OCU II or charger has been dropped and is malfunctioning.
  - There are exposed wires on a charger cable.
  - The robot, OCU II, or charger becomes too hot to touch.
  - There is an unusual sound emitted from any of the components.
  - There is smoke emitted from any of the components.
  - There is a burning smell emitted from any of the components.

If you have questions or concerns regarding the use or operation of the robot or OCU II, discontinue use and contact ReconRobotics or the vendor from whom you purchased your equipment.

Safety Information & Warnings

Read these warnings before charging or using your robot or OCU II. Failure to read and follow these instructions may result in fire, personal injury and/or damage to property.

- To reduce the risk of electric shock, do not remove the shell of the robot, Operator Control Unit II (OCU II), or the chargers. No user-serviceable parts are inside. Refer servicing to qualified ReconRobotics service personnel.
- To reduce the risk of injury or damage, keep these safety precautions in mind when setting up, using, and maintaining your equipment.
- Read all safety and operating instructions before operating the robot or OCU II.
- Retain the safety and operating instructions for future reference.
- Follow all operating and usage instructions.
- Do not attempt to service the robot or OCU II yourself. Repairs or modifications not conducted by authorized personnel will result in the voiding of warranty and/or Annual Maintenance Plans.
- Keep loose clothing and hair away from the robot.
- Considerations for charging:
  - Always charge the robot with the activation pin inserted.
  - Always keep the OCU II turned off while charging.
  - Always charge in a cool, ventilated, fire-safe area.
  - Do not leave system unattended while charging.
  - Always use a proper country-specific AC socket (120-240 VAC) with the battery charger. Do not force the plug into a socket.
  - Ensure the charger plug is inserted at the correct angle when connecting to the robot or OCU II.
  - Ensure the barrel of the charging connector is not deformed, bent or otherwise damaged before inserting in the robot or OCU II.

Table of Contents

***For applicable FCC guidelines, refer to FCC logbook (US customers only).**

Recon Scout CT Kit Inventory

Please inspect the contents of this package to ensure that all materials are present.

If any of the materials are missing, please contact support@reconrobotics.com.

This Recon Scout Kit includes:

- One (1) Recon Scout CT Robot
- One (1) Operator Control Unit II (OCU II) with lanyard
- One (1) 4-Pin AC Dual DC Battery Charger
- One (1) Region-Specific AC Power Cable
- One (1) Spare Activation Pin
- One (1) Tow Disc
- One (1) Tow Cable
- One (1) Tether Kit
- One (1) Volume Control Adaptor
- One (1) Carrying Case
- One (1) User Manual
- Two (2) Spare Thumb Screws (screw type: #10-32 length: 1/2")

How do I request service if I am still experiencing problems with my ReconRobotics equipment?

You can request service by contacting your ReconRobotics sales representative (See Warranty and Service, pg. 21). When contacting us, please have the following information available:

1. Problem description
2. Customer agency
3. Contact name
4. Contact phone or email
5. Serial number of the product that is experiencing difficulties

Our technical staff will attempt to troubleshoot and resolve the problem. If repair service is needed, we will set up an RMA (Return Material Authorization) and arrange for shipment of your equipment to our nearest authorized repair facility. Standard turnaround time for repair is under one week after receipt.

If your issue cannot be resolved remotely, ReconRobotics may provide loaner equipment for Recon Scout CT kits during the repair process.

If your issue is not covered under warranty or by an extended service plan, we will provide a not-to-exceed (NTE) repair cost estimate for your approval before commencing repair. After repairs are complete, you will be invoiced for the actual cost of repairs up to this estimate.

When sending equipment in for RMA, please include the entire kit (robot, OCU II and chargers) to ensure all problems can be identified and necessary repairs can be completed.

If, after remote troubleshooting, the system is sent back for maintenance and no problem can be identified, a diagnostic fee may be assessed.

Troubleshooting (cont.)

Why isn't the robot's IR light turning on?

In order to conserve battery, the IR LED will not turn on if the light sensor detects sufficient light. If the robot's IR light does not turn on when the robot is in a state of complete darkness, there may be an issue with the light sensor, please contact ReconRobotics.

What would cause the IR light to stay on constantly, even in daylight?

If there is dust or debris present on the IR blister, the light sensor may determine the environment has less ambient light than it really does. Ensure that the IR blister is free of dust or debris by wiping it with a soft towel.

The robot or OCU II doesn't seem to be holding a full battery charge. What can be done?

If it feels as though the Recon Scout CT robot or OCU II is not running for its complete battery life on a full charge, there is a simple test you can run to check the performance:

- Fully charge the robot and OCU II (refer to page 7 for instructions). Remove the Picatinny rail and the tow disc (refer to page 9 for instructions). Start the test by pulling the pin from robot and turning on the OCU II. Record the time that the units are turned on. Run both units continuously until:
    a. Robot stops sending video
    b. OCU II screen goes blank
- Record the time. Contact ReconRobotics for service if:
    a. Robot runs for under 50 minutes
    b. OCU II runs for under 120 minutes

Recon Scout CT Components

Recon Scout CT systems include the following:

Two Antennas 	**Stabilizer Tail** 
Two Wheels 	**IR Blister** 
Channel and Microphone (indicated by a sticker) 	**Tow Disc** 
Picatinny Rail 	**Tow Cable** 

If any of these items are missing or damaged, please notify ReconRobotics immediately. (See Warranty and Service, pg. 21)

OCU II Components

The OCU II includes the following components:

Two Antennas	
Lanyard	
Power Switch	
Headphone Jack	
Audio/Video Out Jack*	
Charging Port	

*A/V out signal is only available with Audio and Video Out Cabling Package.

If any of these items are missing or damaged, please notify ReconRobotics immediately. (See Warranty and Service, pg. 21)

Troubleshooting

After using the OCU II for an extended period of time, the screen remains black when it is switched on and it does not control the robot. What could be wrong?

The battery is likely drained, you will need to recharge the OCU II as described in the "Instructions for Use: Chargers" section (page 7).

OCU II is on and the screen is not displaying a solid video stream. What could be wrong?

"Bad" video can have several possible causes:

- The robot may be out of range.
- The robot may be low on power or deactivated.
- The robot or OCU II may be experiencing interference caused by environmental factors (e.g. other radio devices in the area or proximity to metal).

The charge indicator lights do not light up when the robot or OCU II is connected to the battery charger.

Refer to page 7 for instructions on how to read the indicator lights on the chargers. If the issues continue, test for:

- Faulty power to the charger. Try powering the charger from another source.
- A general failure in the charger. If the problem persists after changing the power supply, contact ReconRobotics.

Headphones are plugged into the OCU II, but there is only static. Why?

The OCU II will only provide audio when using an active, audio-enabled robot on the same operational channel.

Frequently Asked Questions

How long will the robot run on a full charge?

On a fully charged battery, the robot should operate for 60 minutes in standard use of driving and observation on flat terrain. Payloads and terrain will cause this to vary.

How long will the OCU II run on a full charge?

The battery run time of the OCU II is approximately 120 minutes.

How many times can the robot and OCU II be recharged?

The robot and OCU use Lithium Polymer batteries which are expected to maintain at least 80% of their runtime after 300 recharge cycles.

How long does it take to recharge the OCU II and robot?

The recharging times for the OCU II and robot are approximately one to three hours depending on the current state of charge and age of battery.

Can the robot be operated in wet conditions?

The OCU II should only be used in a dry environment. The warranty and Annual Maintenance Plan do not cover any damage resulting from exposure of the system to water, salt water spray, hazardous or caustic chemicals, etc.

The Recon Scout CT robot is water resistant to incidental immersion in 1 foot (30 cm) of water for up to five minutes. Payloads may not be water resistant.

Where can I find the serial numbers on my robot or OCU II?

Robot: Underside of shell, near the tail mounting point.
OCU II: Bottom of the back side, near the lanyard mounting post.
Format: Eight to ten digits with an alpha character or two.

OCU II Audio/Video Out Capabilities

Audio Output

The OCU II is capable of receiving audio transmitted from the Recon Scout CT robot. To listen, plug the provided volume control adaptor into the appropriate jack on the left-hand side of the OCU II. Then plug headphones into the volume control adaptor. Headphones approved for Apple or Android devices may not work with the provided volume control adaptor.

Ensure all headphones are using an in-line volume control. There is no volume control on the OCU itself. Be careful to test the audio volume before using.

Audio/Video Output

The ReconRobotics Audio/Video (A/V) Out Cabling Package (sold separately) can be used to connect the OCU II to an external monitoring/recording device (not included). The A/V Out jack is located on the left-hand side of the OCU II.

Once connected to the OCU II, connect the other end of the A/V Out cable to the appropriate connector on an external device. Please refer to the instruction card provided with the A/V Out Cabling Package for more information.

Do not use third-party cables with the A/V Out jack on the OCU. They may not work properly.

The A/V Out cables in the A/V Out Cabling Package are specially designed to work with the OCU II. Though they may look similar, cables manufactured by a third party will not work appropriately with the OCU II.

Video Only Output

If using the OCU II with a robot that does not have the capability to transmit audio, the video signal can still be output through the A/V Out jack using the appropriate cable. Do not use headphones with the OCU II unless controlling a Recon Scout CT robot.

Quick Start Guide

Basic Deployment Instructions

1. Charge robot or OCU II if needed.
2. Rotate OCU II antennas to an upright position.
3. Switch OCU II on.
4. Pull activation pin from robot. Confirm that robot is broadcasting video and accepting command from the OCU II before deploying.
5. If using headphones with a Recon Scout CT robot, plug in and test the headphones at a low volume before using.
6. Attach payload to rail or tow disc.
7. Place robot and payload on ground.
8. Drive payload to target environment.

Matching Frequency Channels

The operating frequency channel is indicated by a sticker on the robot and OCU II. They must match for successful operation. To deploy multiple robots within the same area of operation, different channels must be used.

The channel designations on the OCU II and robot must match exactly for proper operation. This includes the presence or absence of the ".2" designation along with the A, B, or C identifier.

When operating multiple robot/OCU II systems simultaneously, make sure the robots have different channel letters, for instance A.2 and C. Two robots, one on channel A.2 and one on channel A, will interfere with each other and not work well in the same environment.

CT FAQ

Is the provided tow cable and tow disc required?

No. If a better length, disc, or configuration is identified, please let ReconRobotics know so that this can be shared with other users.

Is there a list of tested and approved payloads for the CT system?

Please refer to the website (http://www.reconrobotics.com/) or contact sales directly.

Other ReconRobotics, Inc. systems allow the operator to tilt the robot to look down. The CT drives a little different and does not tilt downwards. Is there something wrong with the CT?

No, this is the expected behavior. Heavy and tall payloads carried on the Picatinny rail have a risk of tipping the robot forwards and getting the system stuck. To avoid this, the CT software prevents tipping forwards, stopping forward motion abruptly, and accelerating backwards quickly.

Can the wheels and tail of another system be put on the CT?

Yes. The motors in the CT are strong enough to operate with XT-style wheels or XL-style wheels and provide the climbing and driving performance of that system. It is recommended to change the tail as well. Contact sales for the appropriate FMKs. As noted above, the CT will still not tip forwards.

When the CT lands upside down, pushing forwards on the stick does not consistently flip it over. Is there a better method?

Yes. Pull back on the stick and gain a little momentum going reverse. Then push full forward on the stick and the CT should flip over every time. Remember to only drop or throw the CT when the rail and tow disc are disconnected.

Towing Maneuvers

Similar to using a car or truck to tow containers of various lengths and weights, the maneuverability of the CT robot will change with the length of the tow cable and the weight on the tow disc.

- Short tow cables with light payloads are the easiest to maneuver.
- The heavier the payload or the longer the tow cable, the wider the system's turn radius will become.
- For heavy towed payloads, a 3-point turn is often required to maneuver around corners and obstacles. A 3-point turn is shown below.

1. Continue past corner until the payload passes corner.

2. Reverse to give the tow cable some slack.

3. Rotate. Face desired direction before driving forwards.

Unlike a car or truck, the Recon Scout CT can stop in mid-operation and face the payload. This enables several capabilities.

- Visually inspect and monitor the payload status by driving around it
- Monitor the payload in motion by facing it and driving backwards
- Fine-tune the payload's placement by facing it and driving forwards to push it

Pulling while watching payload placement

Pushing payload into place

When maneuvering the robot around the towed payload, remember to back up or turn appropriately to ensure the tow cable has enough slack to swing around. The cable attaches to the tail roughly 6.5" (16.5 cm) behind the operator's point of view.

Instructions for Use: Setup

Setting up the OCU II

Rotate antennas to an upright position as shown. The operator may rotate the antennas up or down as needed to receive the maximum range performance from the robot system while maintaining a comfortable view of the screen.

Modification of the antenna system will void the warranty and may violate any FCC authorization to operate this product.

Powering the OCU II

Flip the power switch at the base of the controller from the **Off** to the **On** position.

The screen should light up indicating the unit is ready to use. If the robot is powered on, video from the robot should appear. Otherwise, the screen will display static.

Powering the Robot

- Pull the activation pin from the robot to power it on.
- Reinserting the pin turns the robot off.
- A click will be heard and felt when the pin is fully seated.

When not in use, always ensure the OCU II is switched off and the robot activation pin is inserted.

Instructions for Use: Chargers

Reading Charge Indicator Lights on Battery Chargers

This kit may include one or both of these chargers. When plugged into an active power source, the indicator LEDs will display the following charge states:

	AC Dual DC Battery Charger	BA5590/BB2590 Field Charger*
		
Green Light 	Fully charged OR Not plugged into OCU II/ robot	Fully charged NOTE: LED light may shut off after charging is complete
Red Light 	Charging	Charging
No Light 	Not receiving power from outlet	Not plugged into OCU II/robot OR Charging is complete (fully charged)
Blinking Light	Charger is connected incorrectly and is not charging the robot/OCU II. Unplug everything and retry (refer to page 8 for instructions).	N/A

*Battery not included.

Carry and Tow Operational Specs

Recon Scout CT Performance Specifications

The Recon Scout CT system's operational parameters like speed and runtime will vary depending on the payload configuration. Based on a series of tests on flat terrain with a vehicle constantly in motion, the following table represents expected system performance based on payload configuration.

Carry (lbs / kg)	Tow (lbs / kg)	Continuous Drive Time (mins)	Speed (fps / mps)
0 - 2 / 0 - 0.9	0 / 0	53	1.6 / 0.48
0 - 2 / 0 - 0.9	1 / 0.45	44	1.2 / 0.36
0 - 2 / 0 - 0.9	2 / 0.9	38	1.0 / 0.3

Multiple payload configurations may be used during a single charge and the robot may be used in a variety of environments (rough terrain, up/down hill climbing) and in a variety of capacities (stationary surveillance, payload delivery). Based on the table above, some *conservative* guidelines would be:

- The system has 53 minutes of continuous movement without a payload
- Carrying weight has minimal effect on run time or speed
- 1 minute of pulling 1 lb (0.45 kg) is the same as 1.5 minutes without a payload
- 1 minute of pulling 2 lbs (0.9 kg) is the same as 2 minutes without a payload

In practice, this means the system can be operated without any payload for 30 minutes and still have enough charge for 15 minutes of pulling 2 pounds.

Operational Specifications (Recon Scout CT)

- Indoor Range (NLOS): Tested to 100ft (30m)
- Outdoor Range (LOS): Tested to 300ft (91m)
- Water resistant to incidental immersion in 1ft (30cm) for up to 5 minutes (payload water resistance may vary)
- Drop Shock Resistance: Tested to 15ft (4.6m) without rail attached
- Throw Shock Resistance: Tested to 30ft (9.1m) without rail attached
- Not rated for being dropped or thrown with rail attached

Carry and Tow Payload Setup

Recon Scout CT Operational Configurations

1. **No payload** The Picatinny rail can be removed using the two thumb screws and the tow cable can be unclipped from the robot. In this configuration the robot can be thrown to be deployed.
2. **Carry payload** The Picatinny rail can be attached to the tail using two of the provided thumb screws. Payloads can then be attached to the Picatinny rail with any Picatinny compliant bracket. If possible, position most of the carried weight behind the center axis of the robot to prevent tipping the robot forwards.
3. **Tow payload** A tow cable of any length can be attached to the tether attach point on the tail. The low friction tow disc with the tow cable is recommended, but the user may experiment with others as needed. Use tape, modify the tow disc, or take some other precaution to ensure the payload does not fall, slide, or tip off the tow disc during operation.
4. **Carry and Tow** Both the rail and tow disc may be used at the same time.

Caution

DO NOT THROW THE ROBOT WITH THE RAIL OR TOW DISC ATTACHED. The robot may be unable to right itself or the payload if they do not land upright.

Considerations When Configuring Various Payloads

- 4 lbs (1.8 kg) is the maximum combined payload weight (not including the Picatinny rail or tow disc).
- When splitting weight between the rail and tow disc, carry at least as much weight as is being towed. This typically improves system maneuverability.
- System maneuverability will vary significantly depending on payload and weight configurations. Each configuration will likely require practice.

Caution

Explosive payloads or payloads exceeding the maximum weight that result in damage to the Recon Scout CT are not covered under warranty.

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AC Dual DC Battery Charger

1. Turn off OCU II and insert activation pin into robot to deactivate before charging.
2. Plug AC electrical cord into the charger. For proper operation, charger must be connected to power source before being connected to robot or OCU II.
3. Plug AC electrical cord into the proper country-specific AC wall socket (120-240 VAC).
4. Plug the appropriate charger cords into the OCU II and robot. Ensure connecting plugs are not bent during insertion or removal. Ensure that the red dot on the connecting plug is aligned with the red line on the robot when inserting (as shown).
5. Remove robot and OCU II from charger when charging is complete.

Caution

To prevent battery damage, DO NOT use any chargers other than those supplied by ReconRobotics.

BA5590/BB2590 Field Charger

1. Turn off OCU II and insert activation pin into robot to deactivate before charging.
2. Plug electrical cord into a 5590 or 2590 battery.
3. Plug the appropriate charger cords into the OCU II and robot. Ensure connecting plugs are not bent during insertion or removal. Ensure that the red dot on the connecting plug is aligned with the red dot on the robot when inserting (as shown).
4. Remove robot and OCU II from charger when charging is complete.

Caution

The charger plugs are NOT interchangeable. Inserting the wrong plug into the robot or OCU II could result in permanent damage.

General Instructions & Recommendations

- Place the chargers in a cool, ventilated, fire-safe area.
- Charge the robot and OCU II once per month, even if they were not used. This will keep the batteries topped off to ensure the robot is always ready for immediate deployment.

Field Maintenance

The Recon Scout CT robots and OCU IIs are designed to provide mission critical information in harsh or hazardous environments, but no product is indestructible. In order to ensure that the equipment continues to perform as expected, please follow these steps after each use of the robot and OCU II.

Robot Field Maintenance

Wheels: If the nut is loose, tighten the nut with a 5/16 inch nut driver. Do not over-tighten. The wheel should spin freely.

Stabilizing Tail: If tail is loose, use a 1/16 inch Allen wrench to tighten the bolts holding on the tail. Do not over-tighten.

Antennas: Visually inspect for scuffing or cracking. If wire is exposed, antennas need to be replaced.

The optimal arrangement of the antennas is sticking relatively straight up into the air with a slight slant toward each other. It may be necessary to manipulate the antennas into this position by making a sharp kink at the bottom of the antenna near the shell and straightening out any other kinks along the length of the antennas.

IR Blister: Lightly dust off the IR Blister to ensure the sensor is clear.

Picatinny Rail: The Picatinny rail may optionally be removed for storage or other missions by removing the two thumb screws. When not using the rail, secure the screws in the rail mounting bracket to avoid losing them (bottom image). When attaching the rail:

- Remove screws from rail
- Put the rail mount on the tail and line up the screw holes
- Insert the screws into the non-threaded holes in the rail (top image). The screws should pass smoothly through the first opening in the rail mount and may require a little push to move through the tail.
- Screw the thumb screws in securely. The end of the screw should be flush with the outside of the rail mount.

OCU II Field Maintenance

Antennas: Ensure the antennas are not bent or kinked and can be easily rotated.

DO NOT DISASSEMBLE THE ROBOT OR OCU II.
There are no user-serviceable parts inside.

Parts Replacement

The parts and tools supplied in a Field Maintenance Kit (FMK) allow the following parts on the Recon Scout CT robot to be replaced:

- Antennas
- Wheels
- Tail
- Activation Pin
- Thumb Screws

ReconRobotics does not supply any repair parts except for what is available in a Field Maintenance Kit (FMK). Repairs or modifications, other than those associated with the FMK, which are not conducted by authorized personnel will result in the voiding of warranty and/or Annual Maintenance Plans. Refer servicing to qualified ReconRobotics service personnel. (See Warranty and Service, pg. 21)

Long Term Wear

A combination of time and payload weight greater than roughly 2 lbs (0.9 kg) may cause the motors to squeak while driving. This squeaking has no effect on system performance other than on the system's stealth capability. This squeaking can be addressed as part of the recommended annual maintenance or with an RMA.