

2012 Edition

AVATAR[®] II

User Manual



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Safety Information

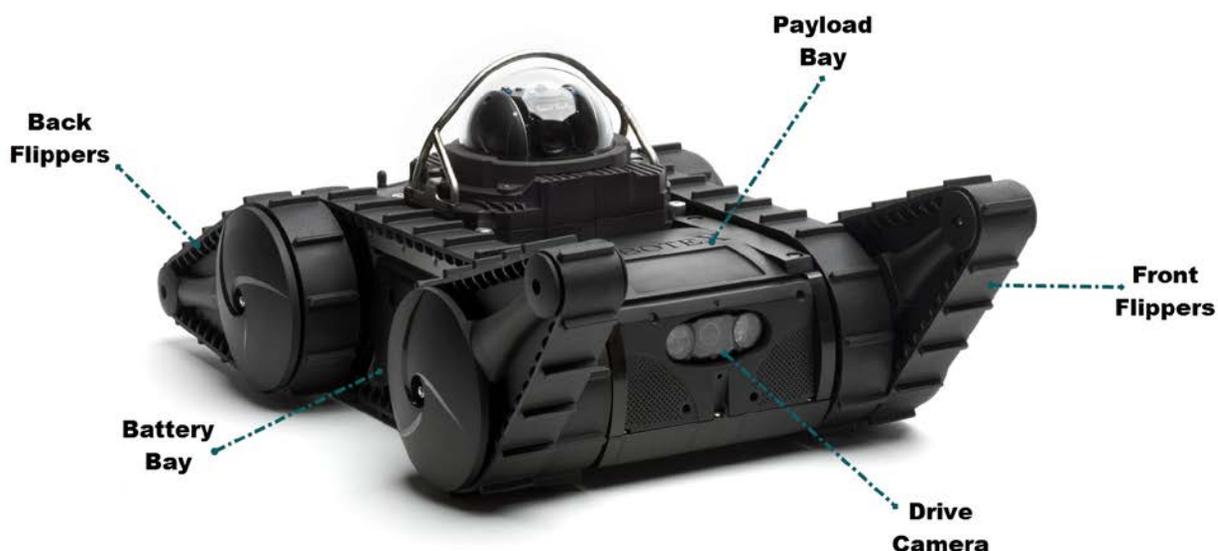
 Read this manual carefully before operating the Avatar® II. 

-  Carefully inspect the Avatar® II before each use.
-  Ensure that all parts are secured in place and properly installed. Do not try to make repairs yourself. Parts may not work properly if they have been repaired by a party other than RoboteX, Inc.
-  Do not modify any components on the robot yourself. Doing so may cause permanent damage not covered by your warranty.
-  Do not place fingers in between the tracks or flippers when the unit is powered on. Keep fingers and other body parts away from moving parts at all times.
-  Care should be taken when running the Avatar® II near pedestrians, small children, or objects that can be harmed. Be aware of your and the robot's surroundings at all times.
-  AC Adapter Handling:
 - Use **only** the supplied AC adapter. Do **not** use any other unauthorized AC adapters. Damage to robot and battery may occur from use of alternate AC adapters.
-  FCC Caution: This equipment generates and uses radio frequency energy and may cause interference to external reception if not installed and used properly in strict accordance with the manufacturer's instructions.
-  Before switching payloads/accessories on the robot, make sure the battery is unplugged and the unit is powered down.

Avatar® II Overview

The Avatar® II is a compact, lightweight robotic platform that is part of the Robotex Avatar® Series. Designed from the ground up for portability, expandability, and ease-of-use, the Avatar® II serves as a useful tool for a variety of users.

The Avatar® II can be customized with a variety of plug-and-play accessories. These accessories facilitate use of the robot in a variety of scenarios, including CBRNE, EOD, and personal security settings. Visit www.robotex.com/build-a-robot or contact your Account Manager for more information.



Handheld Controller Overview

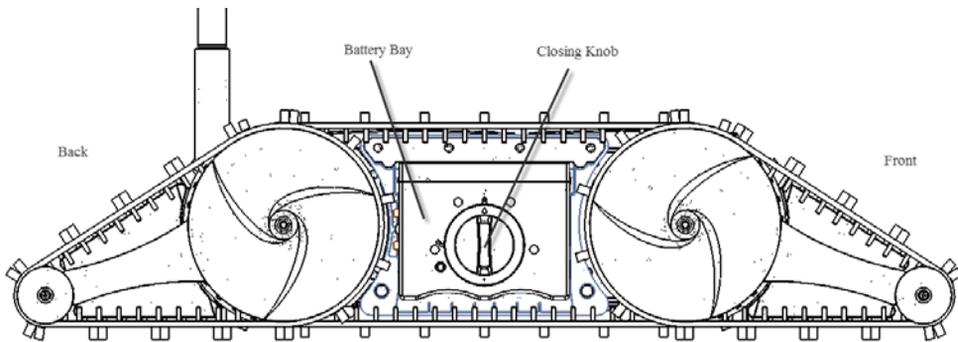
The RoboteX Avatar® II comes with a portable handheld controller for straightforward, easy operation. The controller is equipped with a simple button layout and a touchscreen for enhanced functionality and ease-of-use. The image below displays basic robot and PTZ camera controls.



Basic Setup and Maintenance

1) Pre-Use Setup

A) *Installing the Battery*



- 1) The battery bay is located on the side of the robot. To open the battery bay, grip the “Closing Knob” and push in, turning the knob in counter-clockwise direction. You should feel a slight “pop” or “click,” indicating the door is open. Pull the latch outward and pull out the battery ejector bar to open the battery bay.
- 2) To install the robot battery, line up the connectors on the battery with the slots inside the battery bay. Next, gently slide the battery into the bay. A properly installed battery will slide entirely into the robot – if any part of the battery is sticking out, remove battery, flip, and reinsert.
- 3) Close the battery bay door by returning the door to its closed position, making sure the folding bar is folded over the battery and the upper lip of the battery door tucks underneath the top strip of the battery bay. Shut the latch and turn the “Closing Knob” clockwise. You should feel a “pop” or click” when battery door has closed.



IF FLIPPERS ARE BLOCKING BATTERY DOOR, MOVE THEM MANUALLY IN PAIRS. FRONT AND BACK FLIPPERS MUST BE MOVED IN PAIRS. DO NOT MOVE ONE FLIPPER AT A TIME.

When closing the battery door, make sure the lip at the top strip of the battery door tucks underneath the top of the battery bay.

B) Attaching the Antennas

Make sure that both the robot and the controller antennas are plugged in before powering the unit on.

The *controller antenna* attaches to the silver port on the top left of the controller. **DO NOT** plug it into the covered black port on the top right side of the controller.

The *robot antenna* plugs into the radio port in the rear of the robot (located on the backside of the robot, directly between the back flippers). The robot antenna should already be installed when you unpack the robot.

C) Setting up the Flippers

Before driving the robot, please make sure that both sets of flippers are unfolded. If the robot is being taken out of a case, it is likely that both sets of flippers will be folded in.

Straighten out the front set and back set of flippers separately. When unfolding a set of flippers (front or back), make sure to grip both flippers and move the two flippers in each pair (front pair or back pair) at the same time. Push outward (away from payload ports - it's OK to apply some force) to straighten out the flippers.

D) Powering On the Robot and Controller

Robot

There is no on/off switch on the robot itself. The robot is powered on and off by inserting and removing the battery.

Power On: The robot is powered on whenever the battery is installed.

Power Off: The robot is powered off whenever the battery is removed.

Controller

The Controller has a small black power button located in the top right corner of the controller (just above the screen).

Power On: The Controller is powered on by pressing the black round power button.

Power Off: The Controller is powered off by pressing and holding the black round power button down until the LED light turns off (this will occur after holding the power button for approximately 4 seconds).

2) Post-Use Maintenance

A) Charging the Robot Battery

Instructions

- After removing the battery from the Avatar® II, align the charger and battery connectors and plug the adapter into an AC wall outlet.
- Battery is fully charged when the indicator on the top of the battery shows 5 full black bars, or when the indicator light on the top of the charger turns green.
- To check charge levels, you can refer to the charge indicator on the battery itself, which will tell you how much charge is left. You can also look at the on-screen controller indicators (see page 18).



These are the indicator bars. The dark bars reflect the amount of charge in the battery. Five black bars mean the battery is fully charged. When no black bars are present, the battery is empty. The battery in this picture shows a battery with just under a full charge.

B) Charging the Controller Battery

Instructions

- Plug the adapter into an AC wall outlet.
- Plug the round adapter plug into the round charging port on the bottom of the controller.
- The controller is fully charged when the LED light on the controller turns off or flashes red. If the LED light is solid red, the controller is charging.

C) Folding the Flippers In

- If you wish you put the robot in its case, you will have to folder its flippers in. To do so, it is necessary to “smack” the flippers against the ground with some force to disengage them from their locked position. The recommended method is to grip the robot’s front with one hand and the back handle with another, holding the robot at an angle to hit the flippers against the ground. **NOTE:** Be sure to apply equal pressure to both flippers. Do NOT try to move them one at a time.

In-Depth Controller Overview

1) Basic Avatar® II Controls

Please refer to Figure 1 on page 10 for controller button diagram and labels.

A) Powering On/Off, Audio Volume, and Robot Movement

Power On/Off Button:

- Powers the controller on and off.

Incoming Volume Control Knob:

- Push up = incoming audio volume increases
- Push down = incoming audio volume decreases (hold to mute)

Robot Control Joystick (Left Joystick):

- The left joystick controls robot movement (left/right and forward/reverse).
- The robot responds to a range of input – the further you push the stick, the faster the robot will move. For slow movement, push lightly on the joystick.

B) Flipper Control, IR/LED Light, and Push-to-Talk Audio

Flipper Control Knob (Right Knob):

- Push up = flippers go up
- Push down = flippers go down

Note: When pushing the flipper control knob down, the flippers themselves will stop automatically once they are flat on the ground. To position the flippers below this position, release the flipper control knob and then push down again.

LED Light Switch (Yellow Button):

- Switches the robot's camera between three modes: LED Light, IR Light, and No Light/Off.

Two-Way Audio "Push to Talk" Button (Blue Button):

- Hold down for *outgoing* audio – to project your voice from the robot.
- Release to hear *incoming* audio – to hear what the robot hears.

Note: Unless the blue button is pressed, incoming audio is on by default. There is no incoming audio while the robot is in motion.

Figure 1

Controller Diagram for Avatar® II with PTZ Camera Payload



2) Accessory Controls

A) Pan-Tilt-Zoom (PTZ) Camera Controls

Please refer to Figure 1 on page 10 for controller button diagram and labels for PTZ use.

Camera View Switch (Green Button):

- Switches between the drive camera view, the PTZ Camera view, and the split screen view (displays both drive camera and PTZ Camera views).

PTZ Camera Control Joystick (Right Joystick):

- The right joystick maneuvers the 360° PTZ Camera’s movement (both side-to-side and up-and-down). See below for more details.

PTZ Camera Zoom Knob:

- Push up = camera zooms in
- Push down = camera zooms out

Touchscreen PTZ Reset Button:

- Pressing this button (on the touchscreen) resets the PTZ camera focus and viewing angle (back to a level position).



B) Manipulator Arm Controls

Please refer to Figures 3 and 4 on pages 14-15 for arm diagram and controller button labels for arm use.



NOTE: Please make sure that the front flippers are flat and the rear robot weight is attached when operating the arm. This will stabilize the robot’s weight distribution and help make arm movement and control smoother.

Touchscreen Arm/Drive Mode Switching:

- When this button is displayed in the lower right hand corner of the screen, *the robot is in “Arm Mode.”* This means that both joysticks will control the arm. Full arm control is enabled in this mode only. Driving and robot movement are disabled in this mode. Press this button (on the touchscreen) to toggle to drive mode.
- When this is displayed in the lower right hand corner of the screen, *the robot is in “Drive Mode.”* Driving and partial arm control is enabled. In this mode, the left stick controls robot movement and the right stick controls the arm. Full arm control is disabled.



ARM MODE CONTROLS (see Figure 3 on page 14)



Shoulder and Turret Control (Left Joystick):

- Push Left and Right: Rotate Turret Base
- Push Up and Down: Move Shoulder Joint

Elbow and Wrist Control (Right Joystick):

- Push Left and Right: Rotate Wrist Joint
- Push Up and Down: Move Elbow Joint

Gripper Control Knob:

- Opens and closes gripper

Note: If gripper does not *close* all the way, open gripper past full-open position and try to close again. If the gripper does not *open* all the way, close the gripper until the arm motor stops making a sound and then open it again.

Shoulder + Elbow Combo Control Knob:

- Push Up: Arm reaches forward by moving shoulder and elbow concurrently
- Push Down: Arm retracts by moving shoulder and elbow joints concurrently

DRIVE MODE (see Figure 4 on page 15)



Robot Movement (Left Joystick):

- The left joystick controls main robot movement (left/right and forward/reverse).
- The joystick accepts a range of input – the further you push the stick, the faster the robot will go.

Partial Arm Control – Shoulder and Elbow Movement (Right Joystick):

- Push Left and Right: Rotate Wrist Joint
- Push Up and Down: Move Elbow Joint

Gripper Control Knob:

- Opens and closes gripper

Note: If gripper does not close, open gripper past full-open position and try to close again.

FIGURE 2

Robot Arm Diagram – Elbow, Shoulder, Turret, Gripper, and Arm Camera

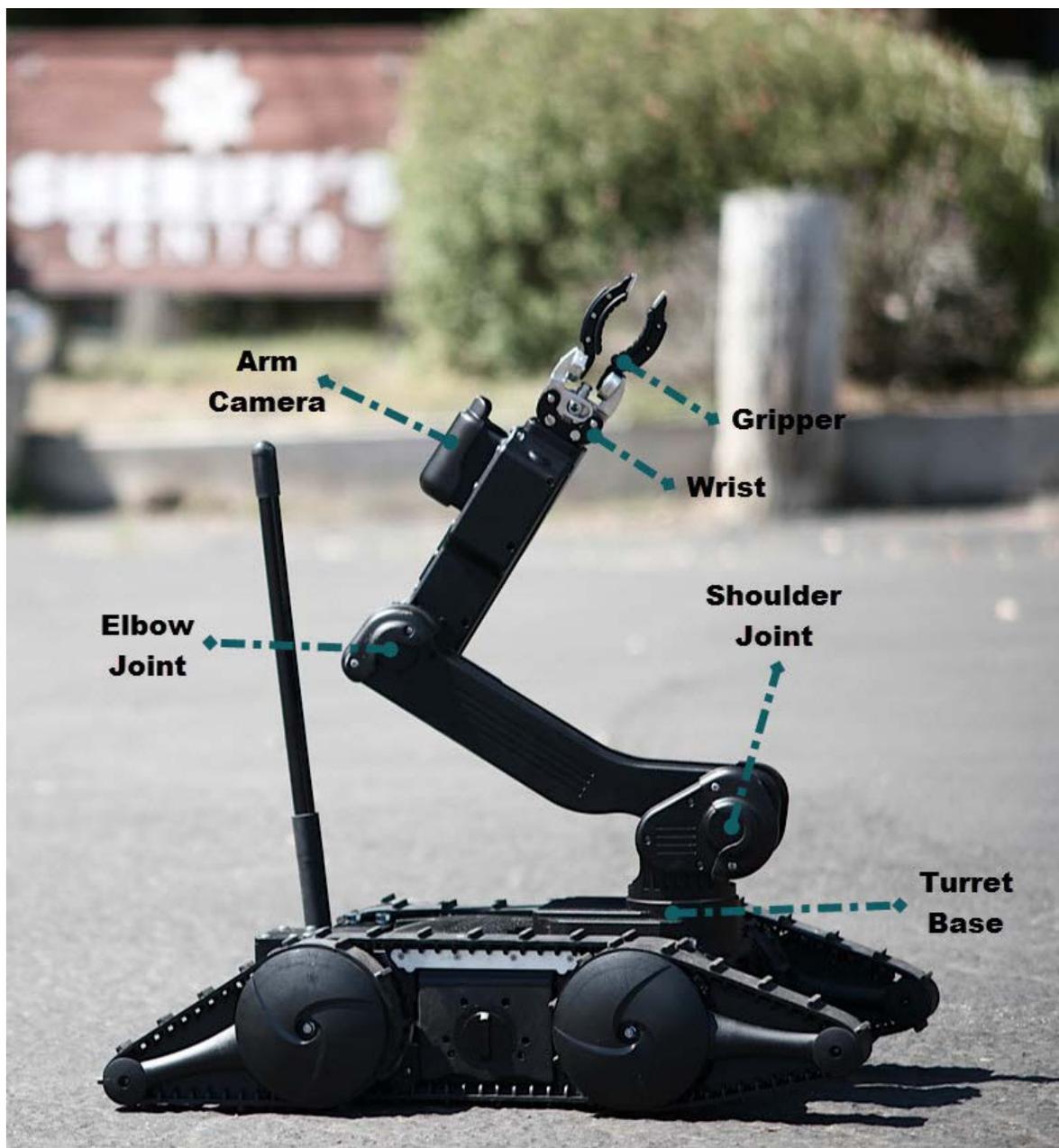


FIGURE 3

Controller for Avatar® II with Manipulator Arm in ARM MODE



FIGURE 4

Controller for Avatar® II with Manipulator Arm Payload in DRIVE MODE



C) 2-in-1 Gas/Radiation Detector Payload Controls

Display Toggle (Green Button):

- Turn On Detector Display: Press and hold for 5 seconds.
- Turn Off Detector Display: Press and hold for 5 seconds.

FIGURE 4

Controller for Avatar® II with 2-in-1 Gas/Radiation Detector Payload



3) Antennas/Ports

There is one antenna that must be securely attached to the left antenna port on the controller before use. *Do not attach the antenna to the right port (covered by black casing).*



 **DO NOT PUT ANTENNA ON RIGHT PORT (COVERED BY BLACK CASING).**

DOING SO WILL PERMANENTLY DAMAGE YOUR CONTROLLER. 

4) Reading the Controller Display

The following icons will be displayed on the Avatar II's controller screen:

<u>Display</u>	<u>Description</u>
	Location: Bottom right of the screen Purpose: Indicates charge level of the robot battery.
	Location: Bottom right of the screen Purpose: Indicates charge level of the controller battery. (Note: This will show a charging plug icon if the Controller is plugged into wall outlet).
	Location: Bottom right of the screen Purpose: Indicates the wireless signal strength between the controller and robot. This will show an "X" mark when there is no connection.
	Location: Bottom right of the screen Purpose: Replaces normal signal strength icon and indicates that the controller is having radio problems. Cycle the power on and off to fix.

RoboteX Avatar® II's on-screen display also features a touchscreen. The following touchscreen buttons can be used to control the Avatar® II:

<u>On-screen Button</u>	<u>Description</u>
	Location: Bottom left of the screen When pressed: Activates the Avatar® II's audio and video recording capability.
	Location: Bottom center of the screen Pressing "—" sign: Decreases brightness of the screen Pressing "+" sign: Increases brightness of the screen

5) Recording Video Files from Controller

A) Recording Video

- 1) To start recording video, press the onscreen “REC” icon in the bottom left hand corner of the touchscreen. The red circle icon should light up and start flashing. Follow the onscreen prompt to begin recording. **Note: Audio level in the recording is controlled by the level of audio on the controller.**
- 2) When you’ve finished recording, press the “REC” onscreen button again to end any ongoing recording sessions (if “REC” is red and has a flashing red circle next to it, then the robot is still recording video). Follow the onscreen prompt to stop recording. At this stage, the controller may take some time to process and store the video file to internal memory.

B) Transferring Files from Controller to USB Drive

- 3) Insert USB flash drive into controller’s USB port. **Note: 16GB size recommended.**
- 4) Follow prompts on screen. You will see two prompts, one after the other.
 - a. “**Transfer Video files?**” – Prompts you to transfer the video files from the controller’s internal memory to the USB stick. Hit “yes” to transfer or “no” to save transfer for later date.
 - b. “**Delete local backup?**” – Asks if you want to clear the controller’s internal memory. Hit “yes” to clear and “no” to keep video stored internally for transfer at a later date. **NOTE:** It is recommended you delete local backup after each time you transfer video to a USB stick.
- 5) Follow the onscreen prompts and wait for video transfer to complete. Remove USB flash drive when prompted.
- 6) Video files are now on USB flash drive. Plug the USB flash drive into a computer to view or download the video files.
- 7) **NOTE:** Depending on the setup of your video player program, you may need to download VLC Media Player to play the video files. Visit www.videolan.org or contact your RoboteX Account Manager for help downloading and installing VLC media player.

Maintenance Checklist

A) Pre-use Checklist:

- Ensure that all components are attached properly.
- Ensure that the controller antenna is tightly attached to correct port.
- Ensure that the robot battery is firmly secured and the battery door completely closed.
- Ensure that the tracks are securely fastened.
- Ensure that the robot camera lenses are properly cleaned.
- If the Avatar® II has been out of use for a long period of time, ensure that the Controller and Robot batteries are fully charged.
- Do a pre-run test drive in safe area to ensure signal does not have interference that may compromise robot functionality during a mission.

B) Post-use Checklist:

- Turn off the controller when the Avatar® II is not in use.
- Take the battery out of the robot when the robot is not in use and store in a cool, dry place.
 -  Turn OFF the controller before removing the battery from the robot.
Doing so prevents accidental movement or damage to internal circuitry of the Avatar® II.
- After using the Avatar® II, it is necessary to perform routine basic maintenance. Failure to perform maintenance may damage parts and increase wear.
 - Ensure that all components are dry and properly wiped clean.
 - If the robot is particularly dirty, spray the robot with garden hose at a low pressure setting with water. Use hand soap to remove additional grime. *Do not use a high pressure hose, abrasive cleaners, or compressed air on the robot, as this may damage the robot's water sealing gaskets.*
 - Check for any damaged or worn-out parts that need to be replaced or repaired before the robot's next use.

Troubleshooting

Improper assembly and setup may cause the Avatar® II to malfunction. Ensure that the following parts are connected tightly and securely:

- Antenna
- Battery (door is closed)

If the Avatar® II is still not functioning properly, try the following:

- Turn off the controller.
- Power the controller back on.
- Remove and reinsert the robot battery, ensuring that the connectors align.

If the reboot still does not solve the problem, please refer to the following list of common problems and solutions. If problems persist, please contact your Account Manager.

A) Common Problems and Solutions

- 1. The robot exits “line of sight” at a distance of less than 50 yards and displays an “X” on the controller signal gauge. Robot movement is disabled or jerky.**

Solution 1: Strong radio devices in the area may be running at the same frequencies that the robot uses. Some houses with stucco and wire mesh are difficult to penetrate with radio signals. Try moving closer to the robot or moving away from possible sources of radio interference.

Solution 2: Try to keep the robot with its antenna right side up. When the robot is upside down, it is possible in some cases for the antennas to lose some range.

Solution 3: Other non-Robotex robots may cause interference. Try moving the Avatar® II away from the other robot.

- 2. The flippers are blocking the battery door.**

Solution 1: The flippers need to be moved away from the battery door. Normally the front flippers are loose right out of the box. If the front flippers (those by the front glass and three lenses) are locked into place, place a knee on the front of the robot (on top of the front payload port) and pull both flippers in tandem toward you. It is OK to apply some force. Repeat for the rear set of flippers if necessary.

Do this in tandem until the flippers pop and move freely or are out of the way of the battery door.

3. The robot has trouble climbing stairs.

Solution 1: The robot is not meant to climb stairs at full speed. Reduce speed to a crawl (by only pushing the drive joystick slightly forward).

Solution 2: After climbing the first step, make sure the front flippers are positioned flat against the ground. Hold down the flipper control knob until flippers are flat.

Solution 3: The robot is unable to climb certain kinds of stairs (slippery metal stairs and those with slick edges when wet). Dry off the robot and attempt again.

Solution 4: The robot will not be able to climb up the first step if the flippers are not manipulated correctly. Flippers should be positioned at the correct angle so as to “grip” the front stair at a diagonal angle. If flippers are at too high an angle, the robot will not move entirely onto the first step.

Solution 5: Some stairs are too steep for the robot to climb. High Angle Stabilizers can be purchased separately to help climb especially steep sets of stairs. Contact RobotEX for more information.

Solution 6: If the robot continually stutters when climbing stairs, call our Customer Support line.

4. After removing the robot from the case, the Controller does not turn on.

Solution 1: The Controller loses charge when left sitting unused for a long period of time; it may have fully discharged in shipment or after sitting unused in the case. Try recharging the Controller for 2 or 3 hours before using it again. The controller is fully charged when the red LED light turns off or flashes red. If the problem persists, call our Customer Support line.

Customer Care

Robotex, Inc. is committed to providing excellent customer support. As an Avatar® II owner, you will have a dedicated Account Manager that can provide support and troubleshooting assistance.

If you have questions or comments about the Avatar® II, contact your Account Manager directly. If you do not have an Account Manager or do not know if you have one, contact us directly at our Customer Support line.

Customer Support Contact:

Telephone: 650-838-9191

Email: support@robotex.com

Website: www.robotex.com

Customer Support Hours:

Monday through Friday 9am to 7pm – Pacific Standard Time

Saturday 10am to 6pm – Pacific Standard Time

For after-hours calls, please contact your Account Manager directly.

Warranty and Maintenance

The Avatar® II is covered by a one-year warranty on parts failures. This does not cover damage caused by user error or mishandling of product. Contact your Account Manager for warranty claims and questions.

Warranty Contact

Attention – Warranty Support
RoboteX, Inc.
1400 Page Mill Road
Suite 100
Palo Alto, CA 94304
650-838-9191
support@robotex.com

Maintenance Options

Complete maintenance service is available. Avatar® II-certified repair technicians perform module replacement and rebuilding at our maintenance facility in Silicon Valley. Labor is charged as a flat rate depending on the required service.

Contact the RoboteX Service Department for more information:

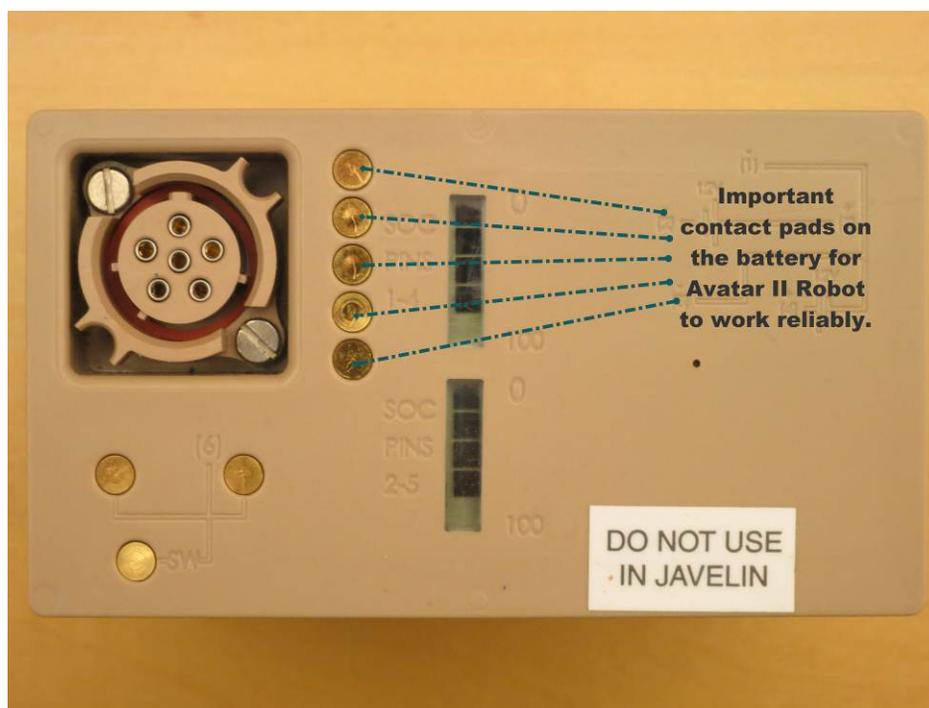
Attention – Service Department
RoboteX, Inc.
1400 Page Mill Road
Suite 100
Palo Alto, CA 94304
650-838-9191
service@robotex.com

Protect Your Robot



There are a few important practices you should follow when using the Avatar® II on a regular basis. Failure to do so may damage your robot.

- ⚠ Before switching/removing payloads on the robot, make sure the robot battery is unplugged.
- ⚠ Please make sure the battery ejector bar is fully folded (over the top of the battery) before locking the battery door of robot.
- ⚠ Please use RoboteX-certified batteries ONLY. Other type of batteries might permanently damage the robot, even they have a similar form factor that will fit inside the unit.
- ⚠ There is ONLY ONE removable antenna on the controller. Please don't put it on the wrong port (the correct antenna port is UNCOVERED).
- ⚠ Please make sure that the front flippers are flat when operating the arm. The easiest way to flatten the flippers is to hold down the flipper control knob until the flippers stop moving and are positioned flat against the ground.
- ⚠ While loading recorded videos to USB, please don't unplug the USB stick before the system finishes downloading files to it.
- ⚠ Please make sure that the 5 metal pads on the battery (shown below) are exposed. If there is a label covering these pads, please remove it before use. Failure to do so might cause the robot not to power on reliably.



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