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## HD2 Remote Treaded Robot



### HD2-S Treaded Robot Features:

- Wheels supported with inner and outer race sealed ball bearings (the wheels are NOT cantilevered or direct driven from the gear motor shaft).
- Wheels are driven with powerful 52mm diameter gear motors with heavy duty #35 chains.
- The treads and four powerful motors allow this robot to ascend/descend stairs and go over most terrain.
- Robot is enclosed and can be sealed making it water tight.
- Chassis is made from aircraft grade aluminum. The design uses all laser cut parts with mortise and tenon design for precise alignment and mating of the parts. The frame is ribbed and gusseted making it very rigid. Welded construction using TIG and MIG for a solid chassis.
- It is about 38 inches long and 20 inches wide by about 9 1/2" high (tread height). There is a very large center cavity for batteries, electronics, cameras, computers, etc. Wider chassis are also available (~26" wide).
- The bottom cover is flanged and all the holes are laser cut and then hand tapped for a perfect fit and seal.
- Custom Treads with aggressive All Terrain pattern. Positive traction. Four driven composite rubber and UHMW wheels with timed teeth that match the cutout pattern on the treads.
- NiMH Battery power 24V 20Ahrs for the drive. 12V 4.5Ahrs for the video and control. Provides over 1.5 hours of continuous driving under standard conditions, If driven intermittently the robot's video and controls will last over 4 hours. Battery upgrades are available.
- Videos are available of the Treaded ATR on our HD2 support page (<http://www.superdroidrobots.com/HD2.htm>).
- The HD2s are made from aluminum, so they will not rust. The HD2-S is coated with durable abrasion resistant flat black paint.
- The HD2-S is also equipped with a roll cage which includes a heavy duty aluminum bar frame structure bent and welded to protect top mounted camera systems from accidental roll over.

### Video and Control Custom Features:

- Below are two video and control packages. We also offer many other custom control choices. Video transmission and robot control is tricky and can be affected by several factors such as walls, electrical interference, landscape, other RF interference, etc. The range (distance) you can achieve is greatly influenced by the above. The HD2-S is equipped with the best overall performance package at an affordable price. Our standard package is a Pelican Case controller. If desired a handheld remote can be selected too

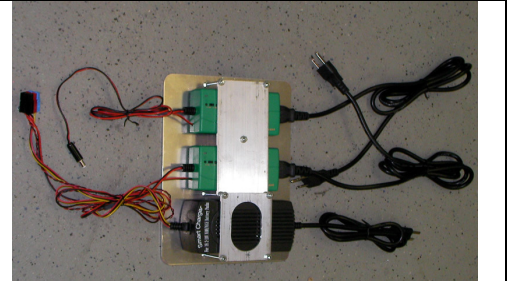
<ul style="list-style-type: none"> <li><b>RC Controller:</b> Standard versions include the following: <ul style="list-style-type: none"> <li>7 Channel 2.4GHz frequency spectrum control system (searches for best most reliable channel) with a Fail Safe long range dual receiver</li> <li>Tested urban range 200+ yards (effective operation range for video and control with multiple building structures, wireless interference, etc. Concrete and steel walls will reduce range further)</li> <li>Tested rural line of site range 1000+ feet</li> <li>7" color wide screen LCD for viewing video</li> <li>Full range of speed control for drive motors.</li> <li>Position control of camera pan and tilt</li> <li>Extra channel(s) for lights or other custom options.</li> </ul> </li> </ul>	
<ul style="list-style-type: none"> <li><b>Handheld System:</b> <ul style="list-style-type: none"> <li>Spektrum remote with custom water jet cut mounting bracket for holding battery, 7" LCD and video receiver</li> <li>Light weight and portable</li> <li>Fully assembled and tested</li> </ul> </li> <li><b>Pelican Case System:</b> <ul style="list-style-type: none"> <li>Pelican case with 7"LCD mounted in the lid and controls mounted in base.</li> <li>Light weight can be carried and operated or placed on hood of car or table and operated</li> <li>Convenient transport case doubles as operator console, just flip it open, erect antennas, and turn it on</li> </ul> </li> </ul>	
<p><b>Video Transmission:</b></p> <ul style="list-style-type: none"> <li>Video is sent back with a 900MHz transmitter. The receiver is mounted to the RC controller or in the Pelican case and the video is transmitted to the 7" color LCD.</li> <li>Tested urban range 200+ yards (effective operation range for video and control with multiple building structures, wireless interference, etc. Concrete and steel walls will reduce range further)</li> <li>Tested rural line of site range 1000+ feet</li> </ul>	
<p><b>Enclosed Camera PTZ:</b></p> <p>This camera system is flush mounted on the top of the robot as shown. It can be oriented to make the front of the robot either end. We typically mount the camera in the rear as shown so the camera sees the treads and roll cage in the lower corners of its view to give the robot user a better perspective of fitting through doorways, etc. (Refer to the On Screen Display images below). It has a <math>\geq 27X</math> optical zoom camera enclosed in a weather tight housing. The High resolution camera has day and night viewing and need less than 1 Lux of light. The camera pan is more than 360 degrees. The tilt is approximately -25 to +60 degrees up. The pan, tilt, and zoom are controlled with the remotes listed above.</p>	

### Battery Charging:

- SuperDroid Robots use NiMH batteries. The batteries are lighter and hold more charge than lead acid batteries per pound.
- NiMH batteries do not have memory issues like NiCad batteries.
- The NiMH Batteries require special charging considerations.

### Smart Charger Option:

- Multiple chargers mounted together on a bracket or in a case similar to the picture to the right. The chargers are for the 24V motor batteries, 12V video/control battery, and 12V control console battery.
- The chargers are fully automatic and will charge all the batteries simultaneously



### HD2 Upgrades and Add-On Options:

- **OSD (On Screen Display).** This add-on allows the user to view the robot's information through the wireless video link. The 24V drive battery voltage, mAh usage, and current (Amps) are all relayed back on the OSD similar to the images shown below:



- **Remote Release Tow Hitch.** This add-on allows the robot to tow a load and remotely release it. This is useful when you need to deploy a stop strip, etc without putting officers in harms way. The add-on will be mounted on the rear of the robot and will be fully assembled and tested. One of the channels on the remote will control the release.
- **Standard Robot Microphone (for Audio from Robot to Remote).** This add-on installs a microphone on the robot with an amplifier for picking up distant and faint noises. The microphone is a standard compact microphone that is meant for listening to large areas. The microphone will be mounted to the robot and the audio will be transmitted back with the video transmitter via the audio channel. The audio will be broadcast real time on the 7" Color LCD. Volume of the audio can be adjusted on the 7" monitor. The gain, etc of the amplifier is set up on the robot.
- **High Gain Robot Microphone (for Audio from Robot to Remote).** This add-on installs a high quality microphone on the robot with an amplifier for picking up distant and faint noises. The microphone is a high quality microphone that is meant for listening to large areas and reduces the amount of electrical/white noise. The microphone will be mounted to the robot and the audio will be transmitted back with the video transmitter via the audio channel. The audio will be broadcast real time on the 7" Color LCD. Volume of the audio can be adjusted on the 7" monitor. The gain, etc of the microphone and amplifier are set up on the robot. The microphone is shown on the robot picture on the front page of this datasheet.
- **PA System (for Audio from Remote to the Robot).** This add-on allows the user to use a hand held radio to broadcast to the robot through a loud speaker PA system. Using this option along with the above microphone allows 2 way communication between the remote users and the robot. The PA speaker is shown on the robot picture on page one of this datasheet.
- **Mounted LED Lights with controls.** This add-on installs LED lights on the robot and includes controls to turn them on or off. The included zoom camera has very low light viewing capabilities, but with the LED lights a very dark area can be lit up. The Lights are mounted to the camera so they pan and tilt with the camera.
- **Upgrade Wireless Video and add Extra Data Receiver.** The Standard Video on the robot is a 900MHz 500mW system. With this system the range can be as far as 1000 feet line of site. Inside a building with cement walls, etc the range is significantly reduced. This upgrade replaces the 500mW 900MHz transmitter with a 1000mW 900MHz transmitter. To extend the range of the data an extra receiver is added to the robot.



- **Upgrade HD2 for removable batteries.** This upgrade allows for the batteries to be removed from the top of the robot. The Standard HD2 has hard mounted batteries inside the chassis. They are charged through a side plug on the robot while inside the robot. This upgrade allows the batteries to be removed from the robot so they can be charged independent of the robot. Further more if a spare set of batteries are ordered, you can remove the dead batteries and put in a new charged set in a matter of minutes. Then you can charge the dead batteries when using the HD2 with the charged set. This upgrade adds another ~2 inches to the width of the robot making it about 22 inches wide.
- **Upgrade HD2 with a spare set of NiMH Batteries.** This upgrade must be used with the above upgrade of the removable batteries. This upgrade provides an additional set of batteries for the HD2. Two (2) 10000nHAhr NiMH 24V Drive Battery packs and one (1) 12V 4500mAh control battery.
- **Upgrade HD2 with from NiMH Batteries to LiFePO4 batteries with 2X the run time.** This upgrade must be used with the above upgrade of the removable batteries. This upgrade provides replaces the two 10Ahr 24V NiMH drive batteries with two 20Ahr LiFePO4 batteries. It also replaces the one 4.5Ahr 12V control battery with one 10Ahr LiFePO4 battery. The upgrade also includes upgraded charges. You get twice the run time with this option and since they are Lithium batteries, the weight does not increase dramatically. The LiFePO4 are specifically designed for our HD2 to handle the demands of the robots motors and loads.
- **Upgrade HD2 with a spare set of LiFePO4 batteries.** This upgrade must be used with the above upgrade of the removable batteries and the LiFePO4 battery upgrade. This upgrade provides an extra set of LiFePO4 batteries. Two (2) 20Ahr LiFePO4 batteries and one (1) 10Ahr LiFePO4 battery.
- **Upgrade HD2 with 4-Axis Arm.** SuperDroid Robots offers many different custom arms. Contact us for different arm configurations, such as position control arms, clutches, more or less axis and/or degrees of freedom. This 4 axis arm includes a shoulder joint that can rotate 180 degrees. An elbow joint that can rotate ~140 degrees, a continuous turn wrist, and a gripper. Each arm axis is directly driven with gear motors with speed control. The arm also includes the necessary controls to control the arm from our controller. When the arm is added, the roll cage is not included and the camera is offset to one side.

### **Delivery:**

1. Procurement of materials, assembly and testing is required. Lead time is typically 3-8 weeks.

### **General Terms:**

1. SuperDroid Robots, Inc is not responsible for special incidental, or consequential damages resulting from any warranty or under any legal theory, including, but not limited to lost profits, downtime, goodwill, damage to, or replacement equipment or property, or any cost of recovering, reprogramming, or reproducing any data stored. ANY LIABILITY SHALL BE LIMITED TO REPLACEMENT OF DEFECTIVE PARTS. SuperDroid Robots, Inc. is further not responsible for any personal damages, including, but not limited to bodily and health damages resulting from any use of our products.
2. SuperDroid Robots, Inc. makes no representations as to the fitness of its products for specific uses. ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE IS HEREBY EXCLUDED.
3. Agreements shall be construed in accordance with the laws of the State of North Carolina, and the rights and obligations created hereby shall be governed by the laws of North Carolina.
4. In the event a dispute or controversy arises, such dispute or controversy (including claims of default) shall be brought in the courts of Wake County, North Carolina and the plaintiff hereby agrees to this choice of venue.

### **Warranty:**

1. SuperDroid Robots will repair any manufacturing defects for 120 days after shipment. Damage from abuse or neglect will not be covered. The cost of shipping is not covered in the warranty. Additional warranty options are available upon request.
2. Consumable items will not be covered by the warranty. Consumable items include, but are not limited to treads, chains, bearings, wheels, and batteries.
3. Extended warranties, spare parts, and maintenance training is available, contact us with specific needs. Service agreements are also available, but never forced upon you!