
MECH RC™
BASE SYSTEM:
SHADOW STALKER™
USER GUIDE

Important Information

Please take the time to read this section carefully and in full before operating your robot.

It is of the utmost importance that you read, understand and observe the following Warnings and Safety Notes and that you operate the robot in accordance with the operating instructions detailed in this user guide. If any information contained in this documentation is unclear, then please contact MechRC support (contact details can be found on the back cover of this book) before attempting to operate the robot. This user guide should be stored in a safe place as it contains important safety information and MUST be passed to the new owner should you ever part with the robot.

If you operate the robot with any of the optional MechRC expansion packs, please ensure that you also take the time to read, understand and observe the Warnings and Safety Notes included in the user guide supplied with them.

Warnings and Safety Notes

Please read this section very carefully. Failure to observe the precautions set out in this section could result in permanent damage to the robot, damage to property, personal injury or voiding of the warranty

General precautions for using and operating your robot

- Before using the robot, read this user guide in full, paying specific attention to the section on using the Lithium Polymer (LiPo) battery and its charger and being sure to observe the information and recommendations stated there.
- This robot is not suitable for children under fourteen years of age.
- This robot system contains small parts which could be swallowed. It is therefore important to **keep the robot out of the reach of small children.**
- When the robot is powered up it is possible that the servos, or any attached peripheral, connected to it could move unexpectedly. For this reason:
  - **Make sure that the robot is operated in an area where there is plenty of space for it to move unobstructed.**
  - **Make sure that there are no open liquid containers in the area where the robot is being operated.**
  - **Make sure that other people are aware that you are operating the robot and that it should not be approached.**
  - **Keep animals and pets away from the area in which the robot is being operated.**
  - **Immediately switch the robot off if somebody or something enters the area in which the robot is being operated.**
  - **Operate the robot with the greatest of care. Keep your distance when servos are moving to avoid the risk of your fingers being trapped or squashed.**
  - **This product should only be operated under the constant supervision of a responsible adult.**
  - **If a servo becomes mechanically stalled (i.e. it is trying to move but is being obstructed in such a way that it cannot), or emits a loud buzzing noise, immediately switch the robot off to avoid permanent damage to the servo.**
- Use the robot only in dry conditions. Protect the robot from dust, damp, humidity, rain, heat, direct sunshine, extreme cold and vibration.
- Assemble and operate the robot in exact accordance with the instructions given in this user guide. Failure to do so may result in permanent damage to the robot and its components and may invalidate your warranty.
- To avoid injury, never touch the robot while it is moving.
- Never attempt to operate the robot on an uneven or unstable surface. Should the robot fall, there is a risk of injury and damage to the robot or property.
- The robot is intended for indoor use only. Use outdoors would expose the robot to environmental hazards which could cause malfunction of the robot, personal injury and damage to the robot and property.
- Do not operate the robot in any environment where combustible or explosive dusts, gases or fluids are present.
- “Left” and “Right” are always referenced as seen from the point of view of the robot.

Upgrading and servicing your robot

- The robot’s “Control Module” does not contain any user serviceable parts. Disassembling the “Control Module” will invalidate the product warranty.
- The “Remote Control Handset” does not contain any user serviceable parts. Disassembling the “Remote Control Handset” will invalidate the product warranty.
- The robot’s servos do not contain any user serviceable parts. Disassembling the servos will invalidate the product warranty.
- Never touch the connections on the “Control Module” with your fingers or metallic objects, as short-circuits and electrostatic discharge may cause permanent damage to the unit.
- Disconnect and remove the battery from the robot when connecting or disconnecting components (mechanical or electrical) to it.
- Take great care to observe the polarity of connectors when attaching any electronic components to the robot. Pay close attention to the orientation of connectors when attaching cables. Incorrect connection could cause permanent damage to the robot’s electronic systems as the robot’s systems are not protected against such circumstances.
- Check the robot regularly for damage to the mechanical parts and cables caused by either wear and tear or incorrect usage. Components that are damaged or have become wet must not be re-used (even after they have been dried).
- When maintaining and upgrading your robot, use only genuine components and accessories manufactured by MechRC or those that are officially licensed by MechRC.
- Never pull on the wires when undoing connections!
- When fixing cables ensure that they will not subject to mechanical strain when the robot is in any position, and that they are not kinked or liable to be squashed when the robot moves as this can cause damage to the wire’s insulation. For this reason all cables should be fastened in such a way that they cannot become entangled in any of the robot’s moving parts.
- It is not permissible to carry out modifications of any kind to the components.
- Remember that all tools can be dangerous if not used correctly. If you are uncertain how to use a tool safely, seek advice from an expert.
- The exposed plastic parts of the robot (only) may be cleaned using a lightly damped cloth. Never clean the mechanical parts, electronic components etc. using cleaning agents, lighter fluid or similar agents.
- Do not exceed the recommended operating voltage of the robot as this is likely to cause permanent damage to the robot and could result in fire.

- Never connect an external power supply to the robot as this is likely to cause permanent damage to the robot and could result in fire.

Battery safety information

The remote control handset uses 4 x AAA (1.5V) batteries. Please read and observe the battery safety information below:

- Battery installation and replacement should only be performed by a responsible adult.
- Switch off the remote control handset before opening the battery compartment.
- Ensure that the battery polarity is correct, observing the (+) and (-) marks on the battery and the handset.
- Only use batteries of the type recommended (or equivalent).
- Do not mix old and new batteries.
- Do not mix alkaline, standard (carbon-zinc), or rechargeable (e.g. nickel-cadmium) batteries.
- Remove used batteries immediately.
- Remove batteries if the handset will not be used for an extended period of time to avoid battery leakage.
- Do not short circuit the battery terminals.
- Dispose of batteries safely. Do not dispose of batteries in fire as batteries may leak or explode.
- Periodically examine the handset for signs of damage to the electrical parts. If found, do not use the handset until the damage has been assessed by your MechRC dealer.
- Rechargeable batteries should be removed from the handset before attempting to charge them.
- Never attempt to recharge non-rechargeable batteries.
- Rechargeable batteries should only be charged under the supervision of a responsible adult.

Lithium Polymer (LiPo) battery information

WARNING: The MechRC System is supplied with a Lithium Polymer (LiPo) battery pack. You must read and understand the information below before charging or using your lithium polymer battery. Failure to read and follow the instructions below may result in fire, personal injury and damage to property if charged or used improperly. The MechRC assumes no liability for failures to comply with these warnings and safety guidelines. If you do not agree with these conditions, return the lithium polymer battery immediately and before any use.

You must read and understand these safety instructions and warnings before using or charging the lithium polymer battery pack supplied with the MechRC System

- Lithium Polymer (LiPo) batteries are volatile. Failure to read and follow the instructions below may result in fire, personal injury and damage to property if charged or used improperly.
- The MechRC Group, its distributors or retailers assume no liability for failures to comply with these warnings and safety guidelines.
- By purchasing this battery, the buyer assumes all risks associated with lithium polymer batteries. If you do not agree with these conditions, return the battery immediately before use.

General Guidelines and Warnings:

- **Warning:** Changes or modifications to this unit 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.
- **Note: The serial cable with ferrite bead attached is designed for exclusive use with this product. Don't use others for this product.**
- **Shielded cables must be used with this unit to ensure compliance with the Class B FCC limits.**
- **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, and (2) this device must accept any interference received, including interference that may cause undesired operation.**
- Use only genuine MechRC battery packs in the robot.
- The MechRC battery pack is not a toy.
- The MechRC battery pack charger is not a toy.
- Disconnect the battery from your robot if it is not to be used for a long period.
- Only use the Lithium Polymer charger supplied with the MechRC System. Do not use a NiMH or NiCd charger. Failure to use the correct charger may cause fire, and could result in personal injury and damage to property.
- Never charge batteries unattended. When charging LiPo batteries you should always remain in constant observation to monitor the charging process and react to potential problems that may occur.
- Some LiPo chargers on the market may have technical deficiencies that may cause it to charge the LiPo batteries incorrectly or at an improper rate. Only use the Lithium Polymer charger supplied with the MechRC system. Always monitor the charging process to assure batteries are being charged properly. Failure to do so may result in fire.
- If at any time you see a battery starting to expand or swell up, discontinue the charging process immediately, disconnect the battery, and place it in a safe place in case of the event of fire.
- It is best to observe the battery for approximately 15 minutes as a safety precaution since delayed battery leakage and chemical reaction can occur and cause fire. Battery observation should occur in a safe area outside of any building or vehicle and away from any combustible material.
- Creating a short-circuit can cause fire! If you accidentally short-circuit the wires together for even a very brief time, the battery must be placed in a safe, open, area that is away from combustible materials for observation for approximately 15 minutes. Additionally, if a short-circuit is made by metal such as jewellery, this may result in severe injury.
- A battery can still ignite even10 minutes after the incident.
- In the event of damage to the robot, you must remove the battery for observation and place in a safe open area away from any combustible material for approximately 15 minutes.
- Never cut the wires, as a short-circuit of the battery could cause fire.
- Never store or charge a battery pack in extreme temperatures, since extreme temperature could cause fire.

Charging Process:

The charger is designed to be connected directly to a 230V/50Hz or 110V/60Hz mains socket, and is intended solely for charging the MechRC battery. Please read all of these instructions before attempting to operate the charger.

- **Never leave a charging battery pack unattended.**
- The battery pack must only be charged under the supervision of a responsible adult.
- Only use the Lithium Polymer charger supplied with the MechRC system. Do not use a NiMH or NiCd charger. Failure to use the correct charger may cause fire, which may result in personal injury and property damage.
- Let the battery cool down to room temperature before charging.
- Do not charge battery packs in series. Charge each battery pack individually. Failure to do so may result in incorrect charging which may cause fire.
- Protect the charger from dust, damp, rain, heat, direct sunshine

and vibration. It should only be operated in dry indoor conditions.

- Provide good ventilation to the charger and battery. Do not cover. Set up the unit with space all around it so that cooling air can circulate unhindered.
- The charger and the battery to be charged should be set up on a heat-resistant, non-flammable and non-conductive surface before use. Keep all inflammable and volatile materials well away from the charging area.
- Disconnect the charger from the mains power supply before connecting or disconnecting the battery.
- The charge leads must not be modified, and must not be coiled up when the charger is in use. Check the unit regularly for damage to cables, connectors, case etc. If the charger is damaged, it must not be used.
- Do not open the charger case.
- Never attempt to recharge faulty, damaged, already charged or hot batteries, or a pack which is not fully discharged.
- Only use the charger to recharge original MechRC batteries.
- Never use a damaged charge lead or battery. Take great care to maintain correct polarity.
- If the battery or charger becomes hot to the touch, disconnect them from the power supply immediately.
- Avoid short-circuits between the positive and negative terminals.
- Clean the charger by rubbing it lightly with a damp cloth when it is not plugged into either the battery or mains supply. Do not use cleaning agents.

Storage & Transportation:

- Store the battery at a temperature between 4°C and 27°C (40°F and 80°F).
- Do not expose the battery pack to direct sunlight or heat for extended periods.
- When transporting or temporarily storing in a vehicle, the temperature range must be greater than -7°C (20°F) but no more than 65°C (150°F).
- Storing the battery at temperatures greater than 71°C (160°F) for extended periods of time (more than 2 hours) may cause damage to the battery and possibly fire.

Caring For Your Lithium Polymer Battery:

- Only use the Lithium Polymer charger supplied with the MechRC System. A poor quality charger can be dangerous.
- Do not discharge the battery to a level below 3V per cell under load. Deep discharge below 3V per cell can deteriorate battery performance.
- Use caution to avoid puncturing the cell. Puncturing the cells may cause fire.

Operating Temperature:

- **Charge:**
  - 0°C to 45°C (32°F to 113°F)
  - Let battery cool down to room temperature before charging.
- **Discharge:**
  - 0°C to 60°C (32°F to 140°F)
  - During discharge and handling of batteries, do not exceed 71°C (160°F).
- **Battery Life:**
  - Batteries that loose 20% of their capacity must be removed from service and disposed of properly.

Construction and components

All products supplied and manufactured by MechRC are subject to ongoing quality control and compliance checks of all materials and production processes. We are sure that you will be satisfied with all aspects of the MechRC system. However, should you encounter any problems or have queries regarding the operation of the robot, please first attempt to find the answer by reading through this user guide. If you still cannot resolve the problem, please consult the “Frequently Asked Questions” section of the MechRC website at **www.mechrc.com/support** and the MechRC forum at **www.pimpmybot.com**

MechRC are constantly seeking to improve the engineering and performance of our product range as well as the production methods used at manufacture. For this reason we reserve the right to make changes to the system in terms of dimensions, design, technology, materials, components, software and fixings at any time and without prior notification. For this reason MechRC will not entertain claims based on illustrations, stated information and descriptions contained on the packaging or in this user guide.

MechRC only endorse the use of software, components and accessories which have been tested and approved by MechRC for their suitability, function, quality and safety. The company accepts product liability if you observe this advice. MechRC does not accept liability if unapproved software, parts or accessories made by other manufacturers or third parties are used as MechRC are not in a position to assess these for their suitability and safety.

Appropriate usage

The MechRC Entertainment Robot System has been developed to be used as an entertainment platform, an experimental platform for the study of robotic principles, and as a medium for testing newly created robot programs within a physical system. The robot can be programmed with the accompanying software (MechRC Commander) to perform different motion sequences supplied with the robot or created by other users. We do not approve the use of the robot in any manner other than that described in this manual. The robot is NOT designed for industrial or commercial applications.

Liability exclusion

The MechRC Entertainment Robot System consists of a fully working robot which can be upgraded with suitable accessories. MechRC recognises that, as the manufacturer, MechRC has no control over the way in which the user might modify, maintain and operate their robot, nor how they install, operate and maintain any associated component or upgrade. For this reason MechRC are obliged to deny any and all liability for loss, damage or costs which are incurred due to the incompetent or incorrect use and operation of ANY MechRC product, or which are connected with such operation in any way. Unless otherwise prescribed by binding law, the obligation of MechRC to pay compensation, regardless of the legal argument employed, is excluded. This includes personal injury, death, damage to buildings, damage to personal property, damage due to loss of business or turnover, interruption of business or other direct or indirect consequent damage whose root cause was the operation of the robot.

The total liability in all cases is limited to the amount paid for the MechRC Entertainment Robot System.

This robot is operated and upgraded at the sole and express responsibility of the user. The only way to avoid injury to persons and damage to property is to handle and operate the robot with the greatest of care and consideration at all times and in strict accordance with the instructions and safety guidelines set out in this user guide.

Before you operate the MechRC Entertainment Robot System for the first time it is important to check whether your private third party liability insurance policy covers you for operating models of this type. If you are not sure, take out a special policy designed to cover the inherent risks of hobby robotics.

This user guide should be stored in a safe place as it contains important safety information and MUST be passed to the new owner should you ever part with the robot.

The sole purpose of this user guide is to provide information. MechRC reserve the right to alter the information without prior notification, and it must not be viewed as an obligation on the part of MechRC. MechRC accepts no responsibility or liability for errors or inaccuracies which may occur in the information section of this manual.

Environmental Protection Notes

The presence of this symbol on a product or its packaging, or in the instructions, means that you must not dispose of that item, or the electronic components contained within it, in the ordinary domestic waste when the product comes to the end of its useful life. The correct method of disposal is to take it to your local collection point for recycling electrical and electronic equipment.

Individual markings indicate which materials can be recycled and re-used. You can make an important contribution to the protection of our shared environment by re-using the product, recycling the basic materials or re-processing redundant equipment in other ways.

Batteries must be removed from the device and taken separately to your local battery disposal centre. If you do not know the location of your nearest recycling centre, please enquire at your local council office.

MechRC Commander Software

Epilepsy warning

Please read through this information before you use the software, or allow a child to operate it.

When subjected to particular flashing lights or lighting effects, many people may be susceptible to epileptic fits or other mental upsets, and it is possible that such individuals may be affected when using computer programs. Even persons whose history of illness does not include epilepsy, and who have never suffered a fit, may be affected by this problem. If you or a family member has ever noticed symptoms which might be connected with epilepsy (such as mental upsets or fits) under the influence of flashing lights, please seek medical advice before you use this software. As a basic rule, parents should always supervise their children when they are using computer programs. If you or your child should encounter symptoms such as dizziness, vision problems, eye or muscle twitches, loss of consciousness, disorientation, or any kind of involuntary movement or cramp when you are using a computer program, switch the machine off immediately and consult your doctor before you resume working on the computer.

Cautionary measures when using the software:

- Do not stand or sit too close to the computer screen.
- Use a flicker-free screen as the computer display.
- Do not carry out programming when you are tired, or if you are short of sleep.
- Ensure that the room in which you carry out programming is always well ventilated.
- When using any computer program, take a break of at least ten to fifteen minutes every hour.

General Information

- These instructions cannot and do not cover problems and queries specific to the user's computer or its operating system.
- MechRC accepts no liability for problems and damage which are caused by improper use of the MechRC Commander software on your computer system.
- It is never possible to exclude the possibility of malfunctions with software products.
- Avoid programming sequences which involve very fast, violent movements, as they are very hard on servos and mechanical systems. The result may be premature wear of these components.
- The programs supplied could cause damage to your robot if it is not maintained or adjusted correctly.

End-User License Agreement

THIS AGREEMENT (the "Agreement") is hereby entered into between MechRC Limited, a limited liability company (the "Licensor") and the party obtaining the right to use the Licensed Product ("you") on the following terms and conditions:

1. Licensed Product. This license allows you to use MechRC Commander version 1.0, the accompanying Documentation and any fixes, releases, upgrades, new versions or enhancements that may subsequently be issued to you (the "Licensed Product") according to the terms set forth in this Agreement.

2. Delivery & Installation. The Licensed Product is distributed to you by electronic download from authorised web site(s) or on physical media (e.g., CD-ROM). You will need to install the Licensed Product on properly configured and compatible computer equipment according to the system requirements specified in the Documentation. If you are loading data into the Licensed Product, you will also need to ensure that your data is in proper format. If the Licensed Product is to interoperate and exchange data with other program(s), you will ensure the Licensed Product and other program(s) are properly configured and tested.

3. Permitted Use of the Licensed Product. Operating License: Subject to payment of the License Fee, you may install the Licensed Product on one (1) computer which meets the system requirements and you may use the Licensed Product during the Term to perform your work and process your own data.

4. Reservation of Rights. The Licensed Product is licensed, not sold to you. The intellectual property rights in the Licensed Product shall at all times remain the exclusive property of Licensor or other owner identified in the Documentation. You agree to use the Licensed Product strictly in accordance with this Agreement. You will not loan, rent, sublicense or distribute any part of the Licensed Product to persons not licensed under this Agreement through public networks or otherwise. You agree not to disassemble, decompile or reverse engineer the Licensed Product. You will ensure that all marks, notices or legends pertaining to the origin, identity or ownership of the Licensed Product remain intact and clearly legible. You may transfer all your rights under this Agreement to another person, provided you delete all copies and cease further use.

5. No Product Support Plan. The Licensor may make available certain help files, patches and additional user Documentation on its web site. At this time, however, Licensor does not provide a Product Support plan or provide updates or new versions of the Licensed Product on a subscription basis. You are encouraged to obtain new versions of the Licensed Product from time to time as they are made generally available, through legitimate means. Licensor may change its Product Support policy from time to time.

6. No Undocumented Features. The Licensed Product does not contain any software locks or undocumented features, other than routine security features described in the Documentation. The Licensor reserves the right to change this policy with respect to any updates or new versions of the Licensed Product released in the future.

7. Academic Copies. The Licensor does not currently offer any special discount on the Licensed Product for academic users (i.e., college, university, public or private school). The Licensor reserves the right to change this policy in the future.

8. Warranties.

(a) Generally. In the event that the Licensee discovers a material error which substantially affects the Licensee's Use of the same and notifies Licensor of the error within 30 days from the date of payment of the Licence Fee (the "warranty period") Licensor shall at its discretion correct by patch or new release (at its option) that part of the software which does not so comply PROVIDED THAT such non-compliance has not been caused by any modification, variation or addition to the software not performed by Licensor or caused by its incorrect use, abuse or corruption of the software or by use of the software with other software or on equipment with which it is incompatible.

(b) No Other Warranty. The Licensee acknowledges that software in general is not error-free and agrees that the existence of such errors shall not constitute a breach of this Licence. The Licensed Product itself and any Product Support are provided strictly on an "as is" and "as available" basis without any express or implied warranty, guarantee or other assurance of quality, conformity with specifications, reliability or functionality. You accept all risk for the suitability, performance or nonperformance of the Licensed Product. LICENSOR MAKES NO WARRANTY, EXPRESS OR IMPLIED, WITH RESPECT TO THIS LICENSED PRODUCT OR ANY SERVICES AND DISCLAIMS ALL IMPLIED WARRANTIES OF TITLE, INTEROPERABILITY, INTEGRATION, MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. THIS AGREEMENT GIVES YOU SPECIFIC LEGAL RIGHTS. YOU MAY HAVE OTHER RIGHTS WHICH VARY BETWEEN JURISDICTIONS. Licensor does not warrant that the functions mentioned in the software will meet the Licensee's individual requirements.

9. Not Fault Tolerant. THE LICENSED PRODUCT IS NOT FAULT TOLERANT AND IS NOT DESIGNED, MANUFACTURED OR INTENDED FOR USE IN HAZARDOUS ENVIRONMENTS REQUIRING FAIL-SAFE PERFORMANCE, SUCH AS IN THE OPERATION OF NUCLEAR FACILITIES, IN WHICH THE FAILURE OF THE LICENSED PRODUCT COULD LEAD TO DEATH, PERSONAL INJURY OR PHYSICAL OR ENVIRONMENTAL DAMAGE.

10. Limitation of Remedies & Liabilities. The following provisions are a material condition of this Agreement and reflect a fair allocation of risk:

(a) Remedies. If Licensor breaches any provision of this Agreement, your sole and exclusive remedy will be to obtain a refund of unamortised License Fees paid by you (using 1 year straight-line amortisation). You also agree that legal remedies alone provide inadequate protection of Licensor's intellectual property rights in the Licensed Product and that, in addition to other relief, Licensor may obtain temporary and permanent injunctions to enforce those rights.

(b) Liabilities. In no event shall Licensor, ITS DIRECTORS, EMPLOYEES, RESELLERS OR DISTRIBUTORS be liable, WHETHER

IN CONTRACT, TORT, NEGLIGENCE, statutory duty OR OTHERWISE, to the Licensee for any loss or damage whatsoever or howsoever caused arising directly or indirectly in connection with this Licence, the software, its use or otherwise, EVEN IF LICENSOR IS NOTIFIED IN ADVANCE OF SUCH POSSIBILITY, except to the extent set out in this License or to the extent that such liability may not be lawfully excluded. The Licensee agrees that the maximum aggregate liability of LICENSOR whether in contract, tort, negligence, statutory duty or otherwise, for any loss or damage whatever arising from or in any way connected with any liability not excluded by this Agreement shall not EXCEED THE LICENSE FEES ACTUALLY PAID BY YOU. This limit shall also apply in the event that any exclusion or other provision contained in this Agreement is held to be invalid for any reason and LICENSOR becomes liable for loss or damage that could otherwise have been limited. LICENSOR expressly excludes liability for indirect, special, incidental or consequential loss or damage which may arise in respect of the software, its use, or in respect of other equipment or property, or for loss of profit, business, revenue, goodwill or anticipated savings. THIS LIMITATION PROTECTS LICENSOR AND ANY DISTRIBUTOR OR RESELLER FROM WHOM YOU OBTAINED THE LICENSED PRODUCT. THIS LIABILITY LIMIT IS INDEPENDENT OF THE EXCLUSIVE REMEDY.

11. Term & Termination.

(a) Generally. Your license will continue in perpetuity unless terminated earlier in accordance with this or another Section of this Agreement. Your license will terminate automatically if you breach any provision of this Agreement. You may terminate your license at any time at your election by permanently deleting the Licensed Product from all computers, destroying all copies and Documentation and ceasing all further use.

(b) Effect of Termination. Termination of this Agreement will terminate your right to possess or Use the Licensed Product. Upon termination for any reason, you agree to destroy the original and all copies of the Licensed Product (including Documentation) and cease all further Use of it. Termination will have no effect on Section 8 (“Warranties”), Section 9 (“Not Fault Tolerant”), Section 10 (“Limitation of Remedies & Liabilities”) or Section 12 (“Disputes, Choice of Law”).

12. Disputes, Choice of Law. This Agreement will be governed by and construed in accordance with the laws of England and shall be subject to the jurisdiction of the English Courts. YOU WILL BRING ANY ACTION AGAINST LICENSOR ARISING OUT OF THIS AGREEMENT WITHIN ONE (1) YEAR AFTER THE CLAIM ARISES, OR BE BARRED. You irrevocably agree that any claim will be brought and maintained by you on an individual basis (and not consolidated with similar cases). If Licensor is required to enforce this Agreement or its rights, you irrevocably agree to receive legal notices and papers by electronic mail at your last known email address (we would also attempt to send you a backup copy by regular mail or regular service).

13. Severability. In the event that any of these terms and conditions or provisions shall be determined by any competent authority to be invalid, unlawful or unenforceable to any extent, such terms, condition or provision shall to that extent be severed from the remaining terms, conditions and provisions which shall continue to be valid to the fullest extent permitted by law.

14. Miscellaneous. This document constitutes the entire and exclusive agreement between the parties with respect to the subject matter hereof and supersedes all other communications, whether written or oral. This document and evidence of its acceptance procedure shall be considered an original document admissible into evidence unless the document’ s authenticity is genuinely placed in question. Nothing in this clause shall relieve either party of liability for fraudulent misrepresentations and neither party shall be entitled to any remedy for either any negligent or any innocent misrepresentation except to the extent (if any) that a court or arbitrator may allow reliance as the same as being fair and reasonable. This Agreement may be modified or amended only by writing signed by an authorised representative of Licensor. It is agreed that resellers and distributors of the Licensed Product have no authority to alter this Agreement. Any notice required to be given under these conditions shall be in writing and shall be sent to the address of Licensor’s registered office. Waiver of any provision hereof in one instance shall not preclude enforcement of it on future occasions. Headings are for reference purposes only and have no substantive effect.

CONTENTS

A MESSAGE FROM THE MECHRC TEAM:

Thank you for purchasing the MechRC 1.0 Humanoid Robot Entertainment System. We believe that you have chosen the finest, most user-friendly humanoid robot system on the market today.

The MechRC design team consists of some of the most respected cybernetic and robotic researchers, designers, manufacturers and artists from around the world to bring you this revolutionary new product. Every aspect of the MechRC system has been meticulously designed with you, the user, in mind to ensure that we provide you with the most rewarding experience that we can.

The MechRC system will appeal to robotics novices and enthusiasts alike, delivering exciting functionality out of the box as well as a host of expansion options to keep you enthralled by this electrifying hobby.

We could spend an eternity telling you how great the MechRC system is but the best way to find out is to try it for yourself. So let's get started and enter the remarkable world of MechRC.

Have fun!

The MechRC Team

This guide is intended to provide you with everything you need to know to get the most out of your MechRC robot, taking you from robotics novice to MechRC guru in a series of easy to follow steps. The guide comprises of 3 sections, each one building on the last to provide you with a comprehensive understanding of the MechRC system:

- Getting Started: Get your MechRC up and running
- MechRC Commander Software: Build custom motions and action sequences for your MechRC
- Advanced Features: Tune, maintain and customise your MechRC robot

Fast Track

FT This guide includes a Fast Track path that takes you through the minimum number of steps necessary to get your robot up and running in the shortest time possible. If you are already familiar with humanoid robotic systems you will find this route helpful and fast.

However, we would still recommend that you take the time to read through the rest of this guide to find out about important safety, maintenance, and tuning procedures as well as the host of customising and expansion opportunities that the MechRC system has to offer.

Head to page 14 to get started...

Throughout this guide you will encounter boxes of text in the side panels of the pages. These boxes contain important information on using your robot as well as additional facts and tips that will enable you to get the most from your MechRC experience. Each text box is characterised by one of the icons shown below to alert you to the significance of its contents:

Stop!	Immediate precautions should be taken to avoid serious damage to the robot or personal injury
Caution!	Precautions should be taken to avoid serious damage to the robot
Top Tip!	Hints and tips from our robot experts to make your MechRC experience as rewarding as possible
Checklist	Check off components and tasks as you go along to make sure that you haven't missed anything
Need to Know	The field of robotics can appear daunting at first, but fear not, 'Need to Know' boxes provide you with all the information you need to become a robotics guru
Cross Reference	Provides useful links to other parts of this guide

SYSTEM COMPONENTS

The MechRC system consists of the following components:

- [ ] MechRC Robot 1
- [ ] Handset 2
- [ ] Battery 3
- [ ] Battery Charger 4
- [ ] Charger Adapter 5
- [ ] CD-ROM 6
- [ ] Serial Cable 7
- [ ] USB Serial Adapter 8
- [ ] User Guide 9
- [ ] Decal Sheet 10

All of the specialist items you will need to get your robot up and running are included in the MechRC system. Please take the time to check the contents of the MechRC package against the image below and the checklist in the side panel.

You'll Also Need...

For Sections 1 and 2 of this guide, the only tool that you will require is a small to medium sized Phillips ("crosshead") screwdriver for opening the battery compartments of the remote control handset

KEY PRODUCT FEATURES

MechRC control module:
The control module contains a 16-bit high speed controller that can be upgraded to provide extended functionality.

MechRC Custom Servos:
Specially designed robotic servos deliver optimum performance in a small package.

MechRC Commander:
The easy-to-use MechRC Commander Software gives you complete control over your robot's actions.

Remote Control:
The gamepad style controller provides an intuitive means by which to control your robot. Just like you would in a video game.

Lithium Polymer Battery:
LiPo batteries serve as the ultimate power source for your robot, delivering up to 45 minutes of running time.

Body Kits:
A range of highly detailed body kits, designed by leading robot artists, are available to give your robot a whole new look.

Electronic Expansion:
The MechRC control module allows users to experiment and build their own electronic peripherals.

Mechanical Expansion:
The modular design of the robot's chassis allows you to easily add additional servos and mechanical components.

Official MechRC Website

Please take the time to visit the official MechRC website to get your hands on the latest software and firmware updates for the MechRC system as well as additional information on using the MechRC system, MechRC sponsored events and other products in the MechRC range.

www.mechrc.com

pimpmybot.com

Join the community of MechRC users on the official MechRC forum. Share ideas, video, knowledge and programs with other members or just drop in for a chat!

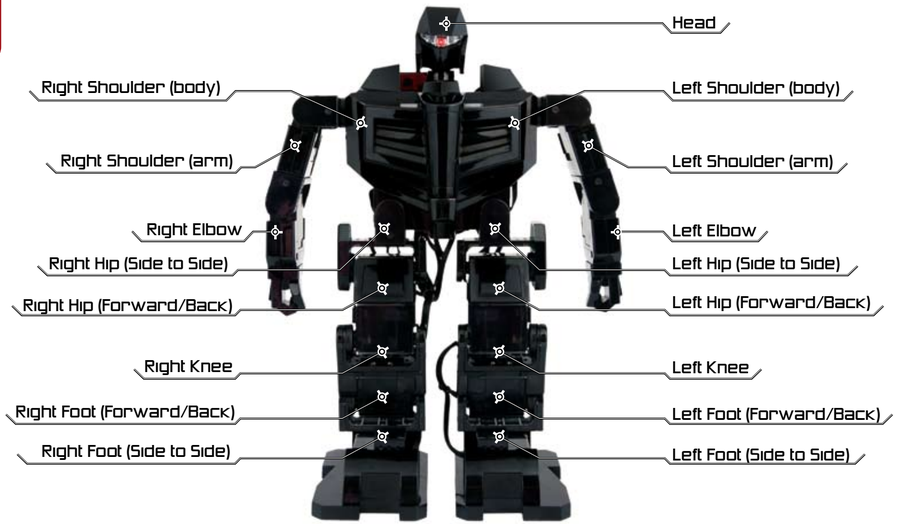
www.pimpmybot.com

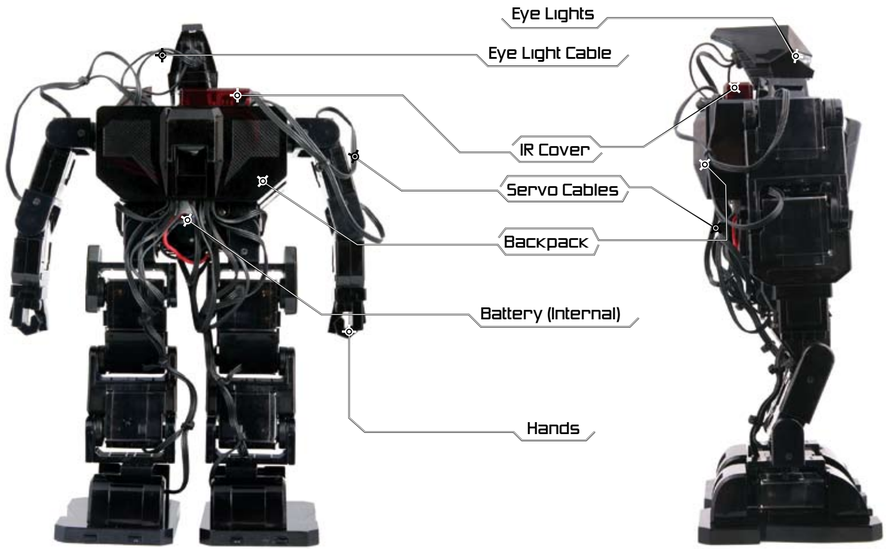
Your left or mine?

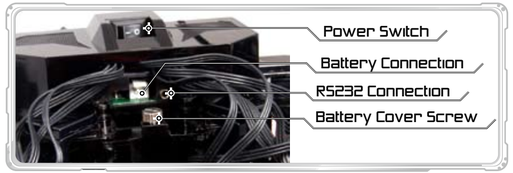
Throughout this guide and in the software we will refer to left and right from the point of view of the robot.

What is a servo?

A servo is a precision electro-mechanical feedback system consisting of a motor, gearbox and controller. A signal is sent to the controller telling it what position to drive the output shaft to. The position of the output shaft is continuously fed back to the controller which ensures that the specified position is maintained, even if a reasonable external force is applied.







Servo Trims

Each of the joints on your MechRC robot has been tuned by our robot engineers at the factory to deliver optimum performance of the system out of the box. However, after extensive use or modification, you may find it necessary to adjust the trims (zero positions) of the robot's joints. To find out more about this process, please refer to Section 3 of this guide

Part I: Getting Started

CHARGING THE MECHRC BATTERY

Warning!

The MechRC robot uses a lithium polymer (LiPo) battery pack as its power source. This type of battery pack can be volatile if used or handled incorrectly. Please take the time to read the battery safety guidelines at the start of this guide to ensure your own safety and the safety of your robot and property.

If you find that the red light on the charger does not illuminate when you connect the battery, check all the wire connections between the charger and battery pack. It could also be that the battery is already charged.

1 Connect the MechRC battery adapter to the output jack of the charger unit.

2 Mate the battery connector with the charger's battery adapter.

3 Plug the charger unit into a mains power outlet. The red light on the charger will illuminate when the battery is charging.

4 When the battery has finished charging the green light on the charger will illuminate. Unplug the charger unit from the mains power.

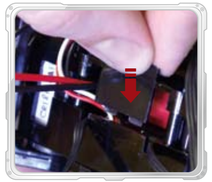
5 Disconnect the battery from the charger by pushing down on the battery release catch and pulling the connectors apart, taking care not to pull on the cables themselves.

INSTALLING THE MECHRC BATTERY

1 Undo the battery cover screw located on the back of the robot between the legs. It should be possible to undo with your fingers, but if the screw is tight you may need to use a medium, flat-bladed screwdriver.

2 Remove the battery cover and ensure that all cables emerging from the battery compartment are located in the cable slots to the left and right of the compartment.

3 Carefully insert the battery into the battery compartment, taking special care not to trap or pinch any cables.



4 Replace the battery compartment cover and fix in place with the cover screw. tighten the screw finger tight so that it can be undone without the need of a screwdriver in the future.

5 Plug the connector of the battery pack into the power socket of the control module.

6 When removing the battery, only pull on the plastic tab, and ensure that you have not hooked any wires around the battery. NEVER pull on the battery wires to remove the battery.

Warning!

Never attempt to power the robot directly from the charger unit. Doing so could irrecoverably damage your robot and the charger and may cause fire.

Caution!

If you meet with resistance when inserting the battery pack into the robot or when replacing the battery cover, check that no wires are obstructing the battery compartment opening. Forcing the battery or cover into the battery compartment may cause damage to the cables.

Warning!

Never attempt to remove the battery by pulling on its wires. This could cause damage to the battery pack and could even result in fire.

Warning!

Please pay careful attention to the battery warning notices printed at the start of this guide. Incorrect installation of batteries could cause permanent damage to the remote control handset and may result in fire.

1

Using a small to medium sized screwdriver, undo the screws holding the two battery covers in place on the underside of the remote control handset.

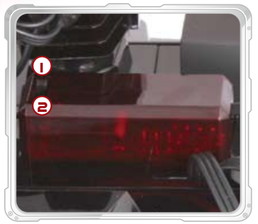
2

Insert batteries into the battery compartments, paying special attention to the polarity shown on the diagram located inside the compartment. Replace the battery covers and tighten the fixing screws.

3

The channel setting for the remote control can be changed between Channels 1 and 2 with the selector switch located on the underside of the handset.

The factory default channel setting for both the robot and the handset is Channel 1. If you need to change the channel on which the robot operates (for example, if you are using two robots at the same time) then you can do so by following these simple instructions.



Set the channel selector switch to the desired position according to the image shown here. You may find this is made easier by using the nib of a ball point pen.

TURNING ON THE ROBOT & HANDSET

Warning!

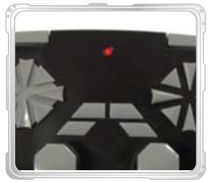
Whilst it is recommended that you hold onto the robot during the power up sequence to avoid it falling over and causing damage to itself, pay careful attention for sudden movements of the joints which could cause fingers to be trapped or crushed.

The safest place to hold the robot during power up is on the side of the body below the chest (indicated by the arrows on the illustration on the facing page).

For further safety instructions on operating the robot, please refer to the guidelines printed at the front of this guide.

1 Switch on the handset by moving the power switch on the underside of the handset to the "ON" position.

2 When powered up, the red light on the handset will be illuminated constantly.



3 Switch on the robot by moving the power switch on the robot's backpack to the "I" position.

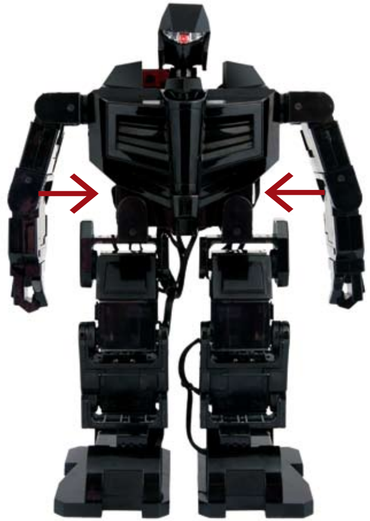
4 The robot's eye light will flash for a moment and then remain constantly illuminated. It's joints will then move to their home positions (shown on the facing page).

Low Battery Warning

When the robot's battery charge becomes too low for the robot to function at full capacity, it will cease all movement and output activity (including audio) and will flash its eye light constantly.

PRE-FLIGHT CHECK

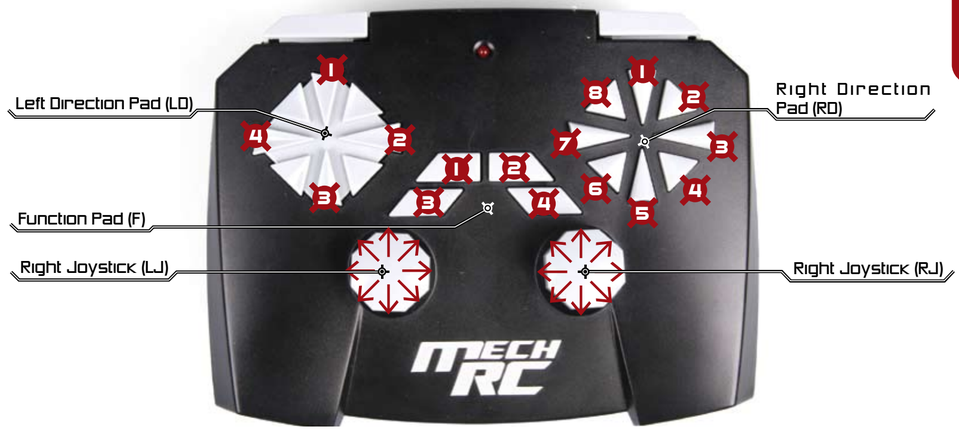
Each time you power up the robot, please review the six-point check printed in the panel to the side of this page before commencing operation.



- ☐ The robot is standing upright in the “home” position shown in the illustration.
- ☐ The eye light is illuminated solidly
- ☐ All cables are able to move freely and are not hooked up on the frame of the robot
- ☐ All decorative plastic parts are firmly attached
- ☐ The robot’s servos are not making any excessive noise
- ☐ None of the joints are limp

IMPORTANT:

The infrared transmitter in the remote control handset points down at approximately a 45 degree angle in order to provide a more comfortable operating angle when controlling the robot. For maximum range of communication between the handset and robot, please observe the illustration below when operating the robot.



Default Handset Functions

The remote control handset is designed to operate in a similar way to a video game controller, allowing the user to use multiple button presses in order to trigger robot actions. This means that the robot is less limited in the number of accessible motions that it can perform. The robot also features "looping" motions which will play the middle section of a motion repeatedly all the while a button (or combination of buttons) is held down. This eliminates the need for the robot to return to the home position at the end of each motion, thereby making motions such as walking more seamless.

Single button press

Combo-button press

Button Combination	MechRC Commander Motion File	Motion Description	Looping Motion?
RJ Up	Walk Forward Loop.MRCmot	Robot walks forward	Yes
RJ Down	Walk Backwards Loop.MRCmot	Robot walks backwards	Yes
RJ Left	Step Left.MRCmot	Robot steps to the left	No
RJ Right	Step Right.MRCmot	Robot steps to the right	No
LJ Up	Get Up From Front.MRCmot	Robot gets up from lying on its front	No
LJ Down	Get Up From Back.MRCmot	Robot gets up from lying on its back	No
LJ Left	Left Ball Kick.MRCmot	Robot kicks with its left foot	No
LJ Right	Right Ball Kick.MRCmot	Robot kicks with its right foot	No
F1	Audio 1.MRCmot	Robot plays audio file stored in memory location 1	No
F2	Audio 2.MRCmot	Robot plays audio file stored in memory location 2	No
F3	Audio 3.MRCmot	Robot plays audio file stored in memory location 3	No
F4	Audio 4.MRCmot	Robot plays audio file stored in memory location 4	No
RD1	Salute.MRCmot	Robot salutes	No
RD2	Bow.MRCmot	Robot bows	No
RD3	Celebrate.MRCmot	Robot pumps the air	Yes
RD4	Wave.MRCmot	Robot waves	Yes
RD5	Handstand.MRCmot	Robot performs a handstand	No

Button Combination	MechRC Commander Motion File	Motion Description	Looping Motion?
RD6	Matrixed.MRCmot	Robot prepares for battle	No
RD7	Karate.MRCmot	Robot performs the "crane" move	No
LS + RD1	Bounce.MRCmot	Robot bounces up and down	No
LS + RD2	Flapper Right.MRCmot	Robot stands on left leg and flaps arms	No
LS + RD3	Sink and Swim	Robot does a dance from the 60's	No
LS + RD4	Pirouette Right.MRCmot	Robot stands on left leg and stretches	No
LS + RD5	Russian.MRCmot	Robot performs a Russian dance	No
LS + RD6	Pirouette Left.MRCmot	Robot stands on right leg and stretches	No
LS + RD7	Break Dance	Robot does a dance from the 80's	No
LS + RD8	Flapper Left.MRCmot	Robot stands on right leg and flaps arms	No
LT	Turn Left 30 Degrees.MRCmot	Robot turns 30 degrees to the left	No
RT	Turn Right 30 Degrees.MRCmot	Robot turns 30 degrees to the right	No
LS + F1	Dance Routine	The ultimate demo!	No

Part II: MechRC Commander Software

If you want to expand your knowledge of the MechRC Commander software beyond the information given in this guide, log on to the official MechRC website for video tutorials and sample files:

www.mechrc.com

Alternatively log on to the community site to find out what other users are doing with their robots:

www.pimpmybot.com

Just like the MechRC hardware, the MechRC Commander software supplied on the CD-ROM has been designed to be intuitive and easy to use whilst still providing advanced users with the flexibility they need to develop complex action sequences and, later, to interface to peripheral devices. This section will guide you through installing and using the MechRC Commander software and all of its functions.

Minimum System Requirements:

Operating System:	Windows XP (Service Pack 2)/ Windows Vista (Service Pack 1)
Processor:	Intel Pentium processor (or compatible), 1 GHz
Memory:	512MB RAM
Hard-disk space:	400MB
Interface:	1 x RS 232 serial port or 1 x USB 1.1
Video:	DirectX 9 compatible XGA (1024x768) display card
Other:	CD-ROM drive

setup

Run "Setup.exe" in the "MechRC Commander" directory of the CD-ROM. Note that you will require Administrator privileges in order to install the software.

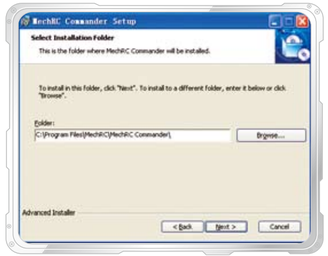
1

When the installation program runs, click the "Next" button to preceed with the installation process.

2

If you agree to the terms and conditions set out in the End User License Agreement, select 'I accept' and click on the "Next" button.

3



Confirm the installation directory and then click the "Next" button.

4

Additional components that may be installed on your computer

During the installation process the installer will install the following prerequisite components on your computer if they are not already present:

- Visual C++ 2008 Redistributable
- DirectX 9.0
- Net Framework 2.0

If these packages are installed by the installer, you will see a progress bar appear on your screen. These installations can be cancelled, but this will also terminate the installation of MechRC Commander.

Windows Vista Users

Windows Vista users may encounter the message "An unidentified program wants access to your computer" during the installation.In this case it is safe to click the "Allow" button.

The robot can be connected directly to a free 9-pin RS232 serial port on your PC, however many computers no longer have such ports and will require the use of the supplied USB to RS232 adapter. To install the adapter, please follow the instructions on this page.

Run "Setup.exe" in the "USB to RS232" directory of the CD-ROM. Note that you will require Administrator privileges in order to install the software.

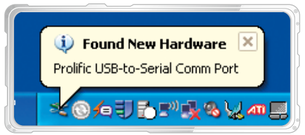
1

After the installation has completed, click the "Finish" button.

2

Connect the USB to RS232 adapter into a free USB port.

3

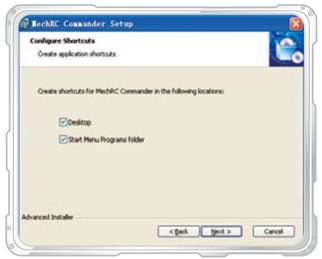


Windows will automatically detect the USB adapter and install the required drivers.

4

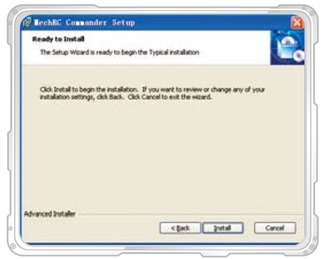
Once Windows has installed the drivers, the USB adapter is available for use.

5



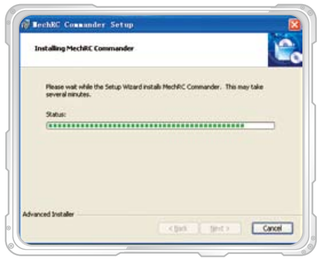
Select the shortcut icons you wish to be installed.

5



To confirm the installation click the "Install" button.

6



The installation will proceed.

7

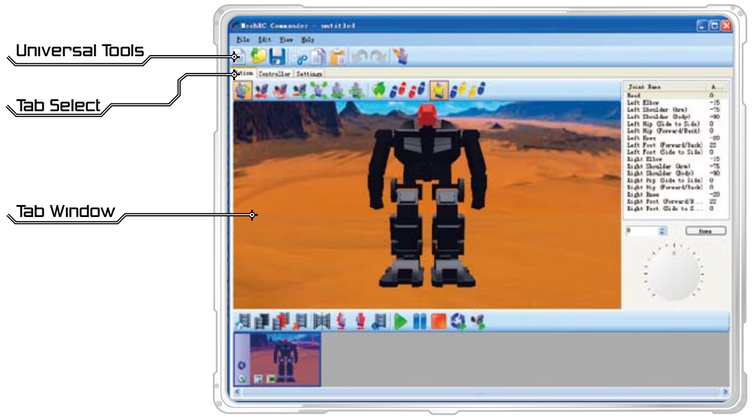
Click the "Finish" button to complete the installation.

8

Windows Vista Users

Windows Vista includes the required drivers as standard and will automatically install the required drivers when the adapter is plugged in.

To run MechRC Commander, double click on the program icon on your desktop or run the software from the Start menu. The software may take a few seconds to appear - please be patient! When the software loads, you will see the main program screen. This screen contains items that are common to all software views (detailed below):



Icon Key:


New File


Open File


Save File


Cut


Copy


Paste


Undo


Redo


Connect/Disconnect from robot (The icon displayed will be dependent on the current state of the connection)

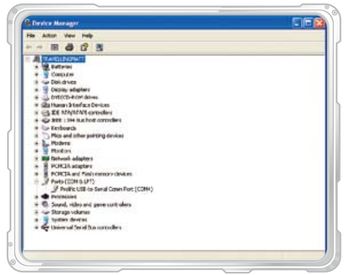
Before connecting to the robot you will need to identify which serial (COM) port of the PC it is connected to. If you will be using the USB to RS232 adapter to link to the robot and have not already done so, connect it to the PC.

Double-click on the System icon in the Control Panel or right click on My Computer and select "Properties".

1

Select the "Hardware" tab and then click "Device Manager" to view your hardware configuration.

2



Locate the "Ports (COM & LPT)" entry in the hardware list to see what physical serial ports your PC has (if your PC has a 9-pin serial connection it will be listed here) or which COM port the USB adapter is providing. This port will be denoted by "Prolific USB-to-Serial Comm Port (COMX), where X is the number of the COM port.

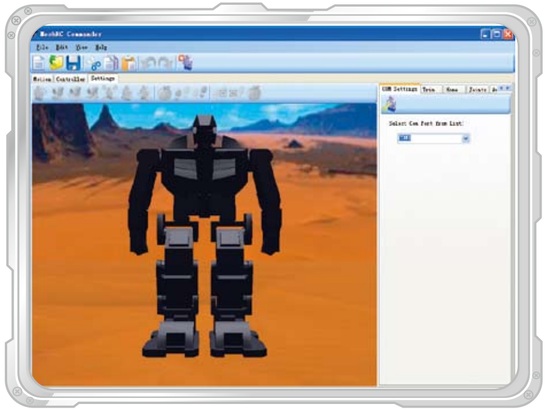
3

Connect the serial programming lead to the 9-pin socket on the USB to RS232 adapter or PC.

4

Insert the 3.5mm jack plug into the serial port of the control module (located on the underside of the robot's backpack).

5



Click on the "Settings" tab in the main program window and then select the "COM Settings" tab on the right hand side of the screen.

6

Select the COM port you identified in Step 3 as being connected to the robot.

7

If the connection is successful a dialogue box will appear informing you that communications with the robot have been established.

If the connection fails, check the physical connections to the robot and double check the COM port settings in the device manager. Note that if you are connecting to a serial port built into the PC there may be more than 1 port available. Try connecting to a different COM number from the drop down menu.

9

Power up the robot and click on the Connect to Robot icon on the universal tool bar.

8

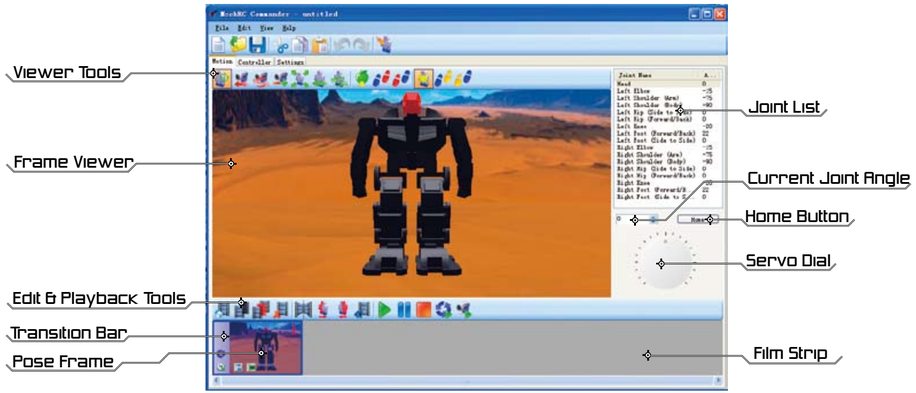
To disconnect from the robot, click on the Disconnect from Robot icon on the universal tool bar.

10

If at any time you wish to check that the connection to the robot is established, you can return to the COM tab in Settings and click on the Test Robot Connection button. If the connection is made then the "Connection to robot established" dialogue box (see Step 9) will be displayed.

11

MechRC Commander makes creating motion files for your robot a piece of cake. The process of creating an action sequence in the motion editor is much like that of creating a stop motion animation with clay models. Each pose frame in the film strip represents a position that the robot must move to. The transition bars between each frame specify the time it takes for the robot to move from the previous frame to the next. By stringing together a number of these frames, complex motions can be sequenced. Motions are edited under the Motion tab in the main program window, the layout of which is shown below:



Icon Key:

Joint Selection Tool	Reference to Chest	Reverse Selection
Pan Camera	Reference to Left Foot	Play Motion
Rotate Camera	Reference to Right Foot	Pause Playback
Zoom Camera In/Out	Insert Home Frame	Stop Playback
Fit Robot to Screen	Insert Duplicate Frame	Loop Playback
Pan Robot	Insert Tween Frame	Toggle Animation of Camera
Rotate Robot	Delete Selection	Apply Loop to Frame
Gravity Snap	Mirror Selection	Set Frame Transition Time
Plant Left Foot	Copy Right to Left	Set Frame Delay Time
Plant Right Foot	Copy Left to Right	Set Frame I/O

Click on the "New File" icon on the universal tool bar. The first frame in the film strip will be set to the home position by default.

1

Create a duplicate frame to edit. In most cases it is advised to keep the first and last frames in a motion as home frames to make transition from one motion to another appear seamless.

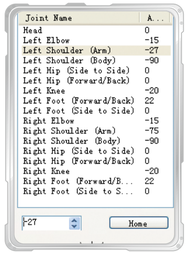
2

Add further frames to the motion sequence with the Duplicate Frame tool.

4

Next you will need to move the joints of the robot to give the pose that you want for the first step in the motion. Most joints can be moved to any position between +90 and -90 degrees (although the arc of travel for some joints may be limited by the frame of the robot). This can be done in one of the three ways described here. Note that if a connection to the robot is established, the robot will move simultaneously with the robot on screen.

Method A: Select a joint to move from the joints list (the selected joint will then become highlighted in red on the robot image in the frame viewer) and move the jog dial with the mouse pointer to the desired angle.



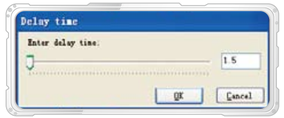
Method B: Select a joint to move from the joints list (the selected joint will then become highlighted in red on the robot image in the frame viewer) and edit the angle in the joint angle field to the desired value (you may also use the up/down arrows to the left of the field to fine tune the value).

Method C: Select the joint selection tool and then click on the joint of the robot you wish to move in the frame viewer (the selected joint will then become highlighted in red). To move the joint click and hold the left mouse button whilst dragging the mouse left and right.

3

Click on the Transition time icon on the transition bar between pose frames. You can now set the time it takes to move between the two frames either side of the transition bar (between 0.1 and 5 seconds). Repeat this process for all pose frames in the motion sequence.

5

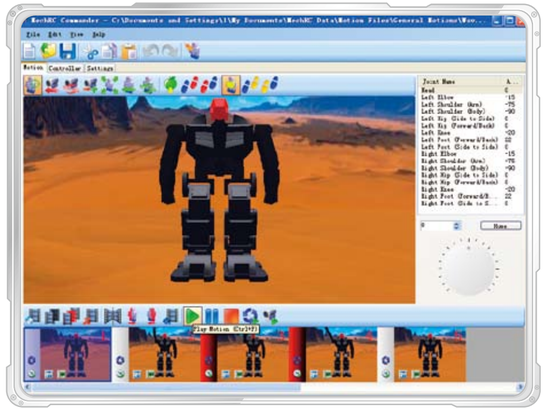


Click on the Delay icon in the pose frame to set a period of time (between 0 and 5 seconds) that the robot will wait for before moving during playback of the selected frame.

6

Remember to end your motion sequence on a home frame by selecting the final frame and clicking on the Insert Home Frame button.

7



You can check the performance of the motion file by clicking the play button on the Edit/Playback tool bar. This will play the motion from the currently selected frame in the film strip to the end. You may also pause, restart or stop the motion at any time during playback. Note that if a connection to the robot is established, the robot will move simultaneously with the robot on screen.

8

Remember to save your motion file by clicking on the Save icon on the universal tool bar. The file will be saved as a .MRCmot file in the MechRC Data\Motions\Shadow Stalker folder in My Documents.

9

First transition time in a motion file

New frames (not those copied from elsewhere) are always created with a 2.5 second transition time associated with them. As a result, you may wish to reduce the time on the first frame of a motion file to a lower value (such as 0.1 of a second).

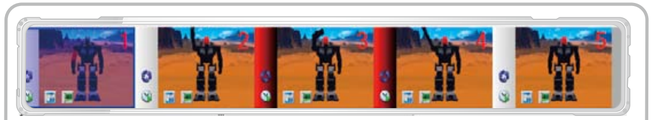
The reason for this is that you are likely to have set the first frame as a home frame. If the robot is already in the home position before you press the play button or the button on the handset, then it will take 2.5 seconds to travel from the home position of the robot to the position in the first frame of the motion. If these positions are the same, then it will result in the robot remaining stationary for the first 2.5 seconds which is likely to be undesirable.

Undo and Redo:

The MechRC Commander software includes these standard editing facilities to help you to recover from accidental changes made to your work. You can undo or redo up to five levels of changes in your work history

At any point while editing a motion file, a controller file or settings you may click the Undo button to cancel the last action performed.

1



Once the Undo button has been pressed, you will be returned to the first frame in the motion sequence.

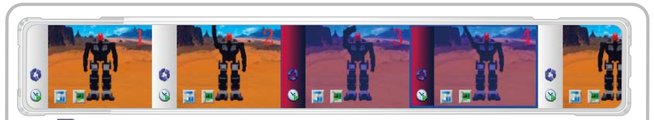
2

Should you wish to reinstate an action in your work history that has been undone, simply click the Redo button.

3

Cut, Copy, Paste, Delete:

The MechRC Commander software includes these standard editing facilities for manipulating frames in the film strip.



Select the frame you wish to copy by left-clicking on it. You can select multiple frames by clicking on the first frame you wish to select, holding down the Shift key and clicking on the last frame you require. To copy the frames click on the copy icon from the universal tool bar.

1

Select the frame immediately before the location you wish to insert the copied frame.

2