



USER'S MANUAL



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# 1. Getting started

Thank You very much for purchasing DitoGear™ motion control equipment. We hope that the devices will meet your expectations bringing a great value to your productions.

This manual includes hardware instructions for using DitoGear™ Trio - a 3-axis real-time operation controller. The device may be used to control one or more of DitoGear™ motion control devices, such as:

1. DitoGear™ OmniSlider
2. DitoGear™ OmniHead
3. DitoGear™ LensDrive
4. Other DitoGear™ motion control devices

Detailed instructions related to these devices has been delivered to you electronically with the purchase. In case you can't find them, download all manuals from: [www.ditogear.com/user-manuals](http://www.ditogear.com/user-manuals)

Please follow the instructions in this manual to learn how to get the most of DitoGear™ Trio. Please ensure to carefully read the safety instructions and precautions contained in this manual and corresponding controllers manuals prior to the first use of the device.

Should you need any assistance or support do not hesitate to contact us at [support@ditogear.com](mailto:support@ditogear.com).

## 1.1 Product version information

This manual refers to DitoGear™ Trio V1 hardware and firmware version dated May 2012.

Latest product manuals can always be found at: [www.ditogear.com/user-manuals](http://www.ditogear.com/user-manuals)

## 1.2 The kit contents

DitoGear™ Trio comes as a single unit, without signal cables and with a shoulder strap mounted.

## 1.3 Precautions for safe use and optimal DitoGear™ Trio performance

Please read and follow the guidelines below to use the Trio safely and ensure its best performance.

### **Caution!**

**Incautious use of ditogear motion control devices may cause serious injuries to your body! Never put your hands or fingers nearby motion control units during operation!**

### **Caution!**

**DitoGear is not responsible for any damage to DitoGear™ Devices or 3rd party equipment caused by improper use of DitoGear™ devices.**

## 1.4 Motor warning signals and behaviors.

The DitoGear™ OmniSlider Servo, OmniHead and LensDrive are equipped with an internal low-level servo motor controller protecting the motor from damage in result of overload or physical blockage of the moving parts.

When the axis motor approaches the performance limit you will hear a short repeating beep from the motor box. It indicates that the motor is working under high payload and is close to its performance limit.

When an excessive load is put on the axis motor or the device is not properly calibrated and the motor tries to work against physical limit, the motor controller will prevent the damage to the motor by cutting the power off. You will hear the continuous beep sound coming from the motor box. It indicates the motor stall.

In this situation you need to press the reset button on the motor housing (OmniSlider, LensDrive) or reconnect signal cable (OmniHead) and probably re-calibrate the device.

Taking the above into account, calibrate the device carefully.

## 2. Getting to know the Trito

DitoGear™ Trito is a high-precision industrial-grade 3-axis realtime controller with an analog joystick dedicated for DitoGear™ motion control equipment.

The Trito provides you with the functionality of controlling up to 3 motion axes with an independent control over max speed, speed damping and calibration of the travel range for each of axes.

The **Joystick** can be moved in 4 directions (up, down, left, right). The 3rd axis is controlled by rotating the arm left or right. The top of the joystick acts as a button.

For each of 3 axes there are 2 adjustment dials: Speed and Damping. The first one adjusts the maximum speed of the axis movement after accelerating to max speed and when the **Joystick** arm is moved to the end of its limit. The latter adjusts speed dampening - it is the time of acceleration and deceleration to/from maximum speed.

The Trito electronics is protected by a sealed housing. It is weather resistant therefore it can work under standard conditions including high humidity, light rain or light snow and low temperatures. However, it is not fully water resistant and should not be used under extreme conditions.

The Trito is powered via RJ45 type signal cables from DitoGear™ motion control devices therefore no additional power source is required for its operation.

The power source is chosen automatically from a device which has the highest battery level.

DitoGear™ Trito has also a voltage measurement feature preventing from depleting and damaging the battery. When the axis' voltage level drops below 10.5V (low limit for most 12V batteries), a continuous audio warning signal will be heard. You can continue working on such battery, but it will probably reduce its future recharging performance or the battery can get damaged. You should replace and recharge the battery as soon as possible.

The Trito consists of the following elements:

- 1 a controller body
- 2 a 3-axis joystick with a button
- 3 3 pairs of adjustment dials
- 4 3 status LEDs, one for each of axes
- 5 3 RJ45 signal connectors
- 6 a shoulder strap



## 3. Setting up the Trito

Follow the instructions below to setup the device for basic operation.

### Using the device for the first time

- 1 Unpack the Trito and remove protective caps and bubble wraps. Be careful not to use any sharp device in order not to scratch the surface of the equipment.
- 2 Prepare your DitoGear™ motion control devices according to procedures described in their user manuals.
- 3 Connect one to three RJ45 type signal cables to Trito's sockets and to Input 1 port of the Breakout Box.  
  
In case of the OmniHead: Connect two RJ45 type signal cables to DitoGear™ Trito and to Input 1 & 2 port of the Breakout Box.
- 4 Connect an RJ45 type signal cable to DitoGear™ motion control devices and to the Output port of a DitoGear™ Breakout Box.
- 5 Finally, connect the power source – a DitoGear™ Power Pack 7Ah/14Ah, a DitoGear™ AC/DC power adapter or a 3rd party compatible power source to a Power port of the Breakout Box.
- 6 Proceed with calibration procedures as described later in this manual. After calibration the Trito is ready to work.

## 4. Calibration

Calibration is the process of defining of the travel length for each of axes of a DitoGear™ motion control rig. It is also defining the limits of the operation for each of axis either for operation convenience or to prevent crossing the physical motion limits on each of axes.

The calibration process with Trito can include from 1 to 3 axes simultaneously. When you power up the Trito, it automatically enters calibration mode for all of its axes. It is indicated by a continuous light on each of status LEDs.

IN and OUT calibration points are being set up automatically basing on the total distance travelled in calibration mode. When you enter the calibration mode, the IN and OUT points are reset. Enter the calibration mode, use the joystick to move the selected axis of the device to the desired IN-point (either “left” or “right”) then move to OUT-point (either “left” or “right”) and press the **Joystick Button** to confirm the travel length and IN/OUT points.

If you move too far in any of directions (beyond the desired IN or OUT-point), you'll have to enter the calibration mode again.

Two calibration methods are recommended:

### Calibration method 1

#### Manual IN-points setting

- 1 Prior to connecting the power to DitoGear™ motion control devices (step 5 in “Setting up the Trito” part) set manually each of axes to the desired IN-point.

- 2 Connect the power. Trito will enter calibration mode for each of axes (all 3 LEDs will light up).
- 3 Travel to the desired OUT-point on each of axes.
- 4 Confirm calibration by pressing the button.

### Calibration method 2

#### Single axis calibration

- 1 Connect the power to your rig. Trito will enter calibration mode for each of axes (all 3 LEDs will light up).
- 2 Press the **Joystick Button** to confirm calibration with “zero” lengths.
- 3 Proceed with calibration for each of axes separately as described below.
- 4 To enter a single-axis calibration mode set both dials of an axis to minimum (fully to the left). All other dials must not be in a “zero” position otherwise they will be included in calibration as well. Press the **Joystick Button** for 3 seconds. The LED will blink a few times and will light up finally indicating calibration mode on that axis.
- 5 Remember to adjust the speed after entering the calibration mode, otherwise the axis won't move.
- 6 Travel to the desired IN-point of the axis then travel to the desired OUT-point and confirm calibration by pressing the **Joystick Button**.

- 7 If you move too far in any of directions (beyond the desired IN or OUT-point, you'll have to enter the calibration mode again.
- 8 Repeat for all of axes.

### Notes

- 1 You can carry out the calibration on one or more axes simultaneously.
- 2 You may also recalibrate an axis anytime you want using the procedures described above.

## 5. Using Mirror mode

You can enter the mirror mode only in operating mode, when the LEDs are not illuminated. Move joystick to maximum deflection in the chosen axis and press the button briefly. From this moment the movement is reversed.

**Note:** You can turn the mirror regardless of the positions of the adjustment dials.

## 6. Conservation guidelines

- 1 While not in use DitoGear™ Trito should be stored in a dry and dust-free place, preferably the Aluminum Transport Case from DitoGear™.
- 2 Always be very careful storing and transporting the device - watch out for the **Joystick** not to damage it.
- 3 After use in humid, wet or dusty conditions make sure to clean the device with a soft fabric.

## 7. Using 3rd Party Power Adapters

DitoGear recommends using original DitoGear™ AC/DC power adapters and batteries. While using a 3rd party adapter make sure it meets the requirements detailed in technical specifications table.

### **Caution!**

**DitoGear is not responsible for any damage or failures caused by the use of a 3rd party power supply adapter.**

## 8. Precautions for Safe Use of DitoGear™ Power Cables

Power cables cannot be looped during operation due to insufficient heat rejection that can cause melting of the cable insulation and ultimately its failure. Remember to disconnect all power cables after use, especially during transportation.

## 9. Using DitoGear™ Power Packs

DitoGear™ Power Pack 7Ah/14Ah and DitoGear™ PowerBox include gel type lead acid batteries, that have a low voltage operating limit. When you discharge the battery below that limit, the irreversible chemical processes occur and the recharging performance can be affected. It is recommended not to fully discharge the battery.

The lead acid battery will self-discharge slowly over time. Leaving the battery for more than 3 months without recharging may result in damage. Remember to recharge the battery at least every 3 months.

## 10. Obtaining Support

In case of any technical issues that can't be solved by carefully reading the manuals do not hesitate to contact us at [support@ditogear.com](mailto:support@ditogear.com)

## 11. Limited Warranty

DitoGear One (1) Year Limited Warranty  
For DitoGear Products Only

Consumer rights and restrictions.

For consumers, who are covered by consumer protection laws or regulations in their country of purchase or, if different, their country of residence, the benefits conferred by this warranty are in addition to all rights and remedies conveyed by such consumer protection laws and regulations. This warranty does not exclude, limit or suspend any rights of consumers arising out of non-conformity with a sales contract. However, as described below, DitoGear disclaims statutory and implied warranties to the extent permitted by law, and in so far as such warranties cannot be disclaimed, all such warranties shall to the extent permitted by law be limited in duration to the duration of the express warranty described below and to the repair or replacement service as determined by DitoGear in its sole discretion. Some states (countries and provinces) do not allow limitations on how long an implied warranty or condition may last, so the limitations described above may not apply to you. This warranty gives you specific legal rights, and you may also have other rights that vary from state to state (or by country or province). This limited warranty is governed by and construed under the laws of the country in which the product purchase took place. DitoGear, the warrantor, under this limited warranty stands for DitoGear™ Robert Paluch, ul.Krańcowa 30, 62-002 Suchy Las, Poland.

### Warranty.

DitoGear's warranty obligations for this hardware product are limited to the terms set forth herein. DitoGear warrants this DitoGear-branded hardware product against defects in materials and workmanship under normal use for a period of one (1) year from the date of retail purchase by the original end-user purchaser ("Warranty Period"). If a hardware defect arises and a valid claim is received within the Warranty Period, at its option and to the extent permitted by law, DitoGear will either (1) repair the hardware defect at no charge, using new or refurbished parts that are equivalent to new in performance and reliability, (2) exchange the product with a product that is new or refurbished that is equivalent to new in performance and reliability and is at least functionally equivalent to the original product, or (3) refund the purchase price of the product. DitoGear may request that you replace defective parts with user-installable new or refurbished parts that DitoGear provides in fulfillment of its warranty obligation.

A replacement product or part, including a user-installable part that has been installed in accordance with instructions provided by DitoGear, assumes the remaining warranty of the original product or ninety (90) days from the date of replacement or repair, whichever provides longer coverage for you.

When a product or part is exchanged, any replacement item becomes your property and the replaced item becomes DitoGear's property. Parts provided by DitoGear in fulfillment of its warranty obligation must be used in products for which warranty service is claimed. When a refund is given, the product for which the refund is provided must be returned to DitoGear and becomes DitoGear's property.

## Exclusions and limitations.

To the extent permitted by law, this warranty and the remedies set forth above are exclusive and in lieu of all other warranties, remedies and conditions, whether oral, written, statutory, express or implied. As permitted by applicable law, DitoGear specifically disclaims any and all statutory or implied warranties, including, without limitation, warranties of merchantability and fitness for a particular purpose and warranties against hidden or latent defects. If DitoGear cannot lawfully disclaim statutory or implied warranties then to the extent permitted by law, all such warranties shall be limited in duration to the duration of the express warranty and to the repair or replacement service as determined by DitoGear in its sole discretion. Some states (countries and provinces) do not allow limitations on how long an implied warranty or condition may last, so the limitations described above may not apply to you. No DitoGear reseller, agent, or employee is authorized to make any modification, extension, or addition to this warranty. If any term is held to be illegal or unenforceable, the legality or enforceability of the remaining terms shall not be affected or impaired.

This Limited Warranty applies only to hardware products manufactured by or for DitoGear. The Limited Warranty does not apply to any non-DitoGear hardware products even if packaged or sold with DitoGear hardware. Manufacturers or suppliers, other than DitoGear, may provide their own warranties to the end user purchaser, but DitoGear, in so far as permitted by law, provides their products "as is".

DitoGear does not warrant that the operation of the product will be uninterrupted or error-free. DitoGear is not responsible for damage arising from failure to follow instructions relating to the product's use.

This warranty does not apply: (a) to consumable parts, such as batteries, unless damage has occurred due to a defect in materials or workmanship; (b) to cosmetic damage, including but not limited to scratches, dents and broken elements on ports; (c) to damage caused by use with non-DitoGear products; (d) to damage caused by accident, abuse, misuse, liquid contact, fire, earthquake or other external causes; (e) to damage caused by operating the product outside the permitted or intended uses described by DitoGear; (f) to damage caused by service (including upgrades and expansions) performed by anyone who is not a representative of DitoGear; (g) to a product or part that has been modified to alter functionality or capability without the written permission of DitoGear; (h) to defects caused by normal wear and tear or otherwise due to the normal aging of the product.

Except as provided in this warranty and to the extent permitted by law, DitoGear is not responsible for direct, special, incidental or consequential damages resulting from any breach of warranty or condition, or under any other legal theory, including but not limited to loss of use; loss of revenue; loss of actual or anticipated profits (including loss of profits on contracts); loss of the use of money; loss of anticipated savings; loss of business; loss of Opportunity; loss of goodwill; loss of reputation; loss of, damage to or any indirect or consequential loss or damage howsoever caused including the replacement of equipment and property. The foregoing limitation shall not apply to death or personal injury claims, or any statutory liability for intentional and gross negligent acts and/or omissions. Some states (countries and provinces) do not allow the exclusion or limitation of incidental or consequential damages, so the above limitation or exclusion may not apply to you.

## Obtaining warranty service.

DitoGear will provide warranty service either (i) at an DitoGear Retail or DitoGear Authorized Service Provider ("ASP") location, where service is performed at the location, or the DitoGear Retail or ASP may send the product to an DitoGear repair service location for service, (ii) by sending you prepaid way bills (and if you no longer have the original packaging, DitoGear may send you packaging material) to enable you to ship the product to DitoGear's repair service location for service, or (iii) by sending you customer installable new or refurbished replacement product or parts to enable you to service or exchange your own product ("DIY Service"). Upon receipt of the replacement product or part, the original product or part becomes the property of DitoGear and you agree to follow instructions, including, if required, arranging the return of original product or part to DitoGear in a timely manner. When providing DIY Service requiring the return of the original product or part, DitoGear may require a credit card authorization as security for the retail price of the replacement product or part and applicable shipping costs. If you follow instructions, DitoGear will cancel the credit card authorization, so you will not be charged for the product or part and shipping costs.

If you fail to return the replaced product or part as instructed or the replaced product or part is not eligible for warranty service, DitoGear will charge the credit card for the authorized amount.

Please access and review the online help resources at the DitoGear website ([www.ditogear.com](http://www.ditogear.com)) and contained in the product manual before requesting warranty service. If the product is still not functioning properly after making use of these resources, please contact DitoGear at [support@ditogear.com](mailto:support@ditogear.com).

Service options, parts availability and response times may vary according to the country in which service is requested. Service options are subject to change at any time. You may be responsible for shipping and handling charges if the product cannot be serviced in the country in which service is requested. If you seek service in a country that is not the country of purchase, you will comply with all applicable import and export laws and regulations and be responsible for all custom duties, VAT, and other associated taxes and charges. For international service, DitoGear may repair or exchange defective products and parts with comparable products and parts that comply with local standards. In accordance with applicable law, DitoGear may require that you furnish proof of purchase details before receiving warranty service.

## 12. Privacy

DitoGear will maintain and use customer information in accordance with the DitoGear Customer Privacy Policy available at [ditogear.com/legal/privacy-policy/](http://ditogear.com/legal/privacy-policy/).

## 13. Miscellaneous

### Trademarks and copyrights

DitoGear™, DitoGear™ OmniController, DitoGear™ Evolution, DitoGear™ Trito , DitoGear™ OmniSlider, DitoGear™ OmniHead and DitoGear™ LensDrive, DitoGear™ Modulo are trademarks of Dito Gear Robert Paluch ul.Krańcowa 30, 62-002 Suchy Las, Poland. Unauthorised use is strictly prohibited. All other trademarks referenced in this manual are used only for informative purposes and are property of their respective owners.

### Disposal and recycling information

The device and all batteries included with it must be disposed of properly according to local laws and regulations. The product must be disposed of separately from the household waste. When your product reaches its end of life, contact DitoGear or your local authorities to learn about recycling options.







[WWW.DITOGEAR.COM](http://WWW.DITOGEAR.COM)