Control Unit

User Manual

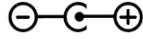Version 1.0

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1. Control Unit ITSC1000

The ITSC1000 Control Unit is a controller for timelapse and digital motion control for video and photo equipment. It allows to control up to 3 industrial class stepper motors and the triggering of shutter and focus of a connected camera. Most models of popular cameras are supported. Auxiliary input and output port for light control and motor control via an analog voltage is also available.

For controlling the outputs the Control Unit has a built in Bluetooth® Smart 4.2 BLE compliant module that allows the connection to a BT LE (Low Energy or 4.0 or higher) capable Smartphone or Tablet. Applications for controlling the Unit are available for Android™ and iOS powered devices on App Stores.

1.1 Technical Data

Operating Parameters	
Temperature Range	20°C to +50°C (-4°F to 122°F)
Maximum Relative Humidity	90%, noncondensing
Ports & Connection	
Supply Connector	5.5/2.1mm or 5.5/2.5mm (Outer/Inner diameter) DC barrel - center positive ⊖—Ͼ—⊕
Supply Voltage	9 –16 Vdc stabilized voltage
Supply Current	Source shall be capable of providing minimum 2A
Motor Output	3 x Molex 22-05-3041 (fitting to Motor Connector Molex 22-01-3047)
Motor Type	Bipolar 4-wire stepper Motor maximum 12V and 1,4A rated recommended with a minimum isolation voltage of 24V
Camera Trigger Port	2,5mm (3/32") Stereo Klinke / TRS Sleeve: GND, Ring: Focus, Tip: Shutter Internal pull-up 3,3V , Maximal Voltage: 5Vdc
Auxiliary Port	3,5mm (1/8") Stereo Klinke / TRS Sleeve: GND, Ring: Aux 2 In/Out, Tip: Aux 1 In/Out Internal pull-up 3,3V , Maximal Voltage: 5Vdc
USB Port	USB Micro B Used for Firmware Updates and future use Max Voltage 5Vdc, no supply of motors via USB

1.2 Interface Definition
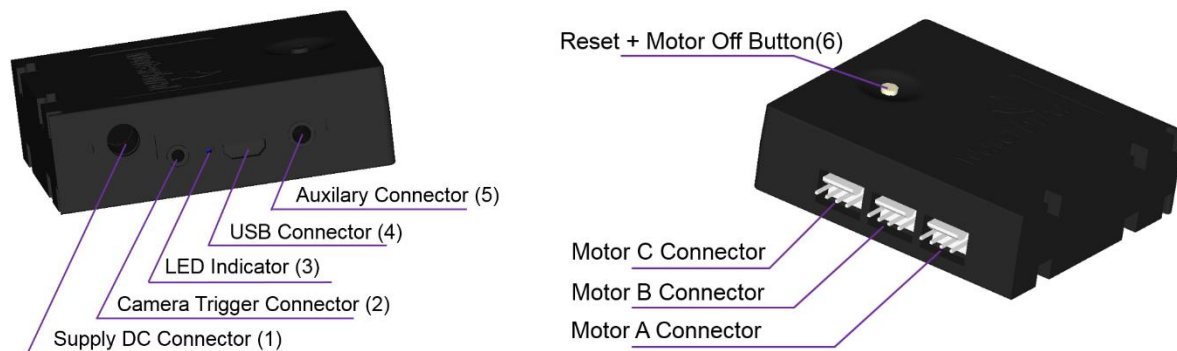
A, B, C) Motor Connectors

These are the connectors for connecting the bipolar stepping motors.

The Motor of the Slider carriage needs to be connected at Port A.

Motor Connector	Connected Motor
A	Motor of the Slider carriage
B	Not activated, for future use (e.g. Pan/Tilt, Up/Down or rotating)
C	Not activated, for future use (e.g. Pan/Tilt, Up/Down or rotating)

1) Supply DC Connector

The Supply DC Connector is the power source for Motor and Logic part. A stabilized DC voltage between 9 – 16 Vdc must be used. Typically 12V or 14V Battery packs are recommended.

2) Camera Trigger Connector

Control Unit can control a camera through the wired remote shutter port with 2.5mm Klinke (3/32" Male TRS) connector. Standard Cables are available for most camera models on the market.

Control Unit can control a camera through the wired remote shutter port with 2.5mm Klinke (3/32" Male TRS) connector. Standard Cables are available for most camera models on the market.

The Camera Trigger Connector provides control over the focus and shutter trigger only, it is not possible to control ISO, aperture, or other settings of the camera over this port. If you set your camera to bulb mode the control unit can control the shutter speed (if your camera supports this mode).

3) LED Indicator

The blue LED Indicator shows the current status of the Control Unit. If no light is visible the Control Unit is unpowered or in Bootloader Mode.

If the blue LED Indicator is flashing the Control Unit is waiting for a connection to a Control device (e.g. Smartphone or Tablet).

If the blue LED Indicator is constantly on, the Control Unit is connected and ready to be used.

4) USB Connector

The USB connector can be used to control the Control Unit via a PC (Software planned to be released in the future) and for firmware updates. Powering the Control Unit via USB is only possible for firmware updates, no Motor control is possible if no power is available on the Supply DC Connector.

5) Auxiliary Connector

This Port can be used to connect accessories like a manual knob or external controls e.g. to control a light that is switching on and off before and after the picture taken for long duration time-lapse.

6) Reset + Motor Off Button

This button can be pressed to reset the internal processor of the Control Unit. This causes also a sudden stop of all connected Motors. You can use it if the System does not react as desired to prevent from damaging equipment. Please take care that the Motors will not be powered after pressing. And in case of vertical usage and high load the carriage could be pulled down by gravity. After pressing the button the initialization of the slider needs to be repeated via the App.

## 1.3 Mounting and Dismounting on Slider

Mounting Bracket

Together with the Control Unit comes a specialy designed mounting bracket to be mounted on the carriage of the Slider System.

If you have bought the Control Unit as standalone device you first need to fix the mounting bracket on your slider system with two countersunk screws.

If you have bought the set with Multi Slider the mounting plate is already fixed on the slider carriage.

Mounting of Control Unit

To mount the Control Unit on the Mounting Bracket, first push the Control Unit on the mounting bracket so it is aligned with the hooks, then push the Control Unit to the right side as shown in picture till the snap-fit is in place.
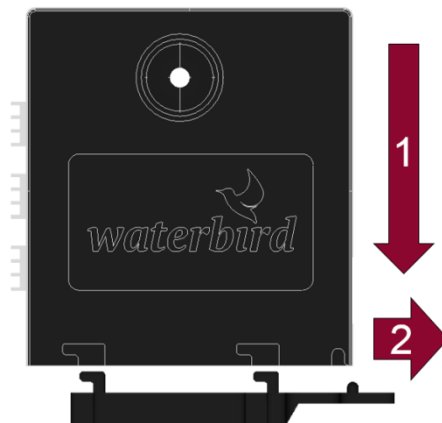
Dismounting of Control Unit

To dismount the Control Unit from the Mounting Bracket, first push down the snap-fit with a finger and move the Control Unit to the left while still holding down the snap-fit.
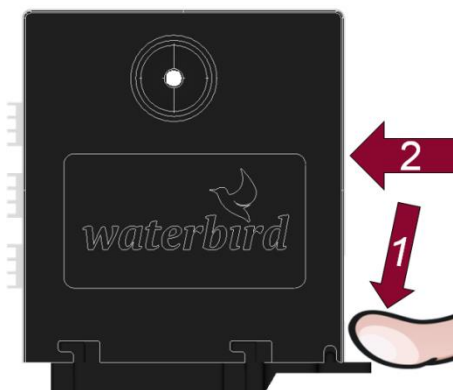
1.4 Handling and Safety Instructions

The Control Unit is designed to be mounted with the included mounting bracket. Do not use another method of fixing the Control Unit to the Slider.

Do not use the Control Unit in wet or humid environment like rain, snow, spray or waterfalls without extra protection against humidity intrusion in the electronic.

Do not install this Unit near a heater, inflammable material or oily or dusty location or in a location continuously exposed to direct sunlight or in a location where gas may leak.

Do not cover the Control Unit with Metal Objects to ensure proper operation of the wireless communication.

Do not attempt to repair, disassemble, or modify the Unit by yourself. There are no serviceable parts inside and opening the Unit will void the warranty.

Remove all foreign substances such as dust or water from the power plug terminals using a dry cloth on a regular basis. - Unplug all connectors and clean it with a dry cloth without alcohol or other solvents.

Do not pull or excessively bend the cables. Do not twist or tie the cables. Do not hook the cables over a metal object or place a heavy object on the cables. Do not pull the cables, when unplugging unplug the connector by holding the plug. Do not put force on the cables in any direction when connected to the Control Unit, this can damage the Control Unit and connectors.

Before switching on the power to the Control Unit ensure that the Motors can spin feely and no harm to humans, animals or objects is possible in case the connected motors start moving.

Do not use the Control Unit if it is damaged, the isolation on the cables is damaged or it shows any abnormality like excessive heat dissipation that damaged the plastic housing.

It is normal that the Control Unit gets warm during operation. To avoid overheating do not cover the Control Unit with thermally insulating material and allow free airflow.

1.5 Troubleshooting

Camera does not trigger/focus when function in app is used.

- Please check the trigger cable if properly plugged into the control unit's CAM socket and to the camera.

- Check if the Camera is switch on.

- If focusing is not working check if the camera/lens is set to manual focus.

- Some cameras require settings in the menu to allow external trigger cable to be used, please check with the manual of your camera.

Motor does not start when function in app is used.

- Please check if the motor cable is properly plugged into the control unit's Motor socket and the right socket is used (Socket A for Slider).

- Check if the power supply is connected. If only USB is connected the Control Unit may connect to the App, but the Motors will not work.

- Check if supply voltage is in range 9-16 Vdc (The battery may be empty.)

- Check if any error information is shown in the App.

1.6 Regulatory Hints

INSTRUCTION ABOUT THE WEEE MARK

Correct Disposal of This Product (Waste Electrical & Electronic Equipment) (Applicable in countries with separate collection systems) This marking on the product, accessories or literature indicates that the product and its electronic accessories (cables, adapters,..) should not be disposed of with other household waste at the end of their working life. To prevent possible harm to the environment or human health from uncontrolled waste disposal, please separate these items from other types of waste and recycle them responsibly to promote the sustainable reuse of material resources. Household users should contact either the retailer where they purchased this product, or their local government office, for details of where and how they can take these items for environmentally safe recycling. Business users should contact their supplier and check the terms and conditions of the purchase contract. This product and its electronic accessories should not be mixed with other commercial wastes for disposal.

USA:

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.

Canada:

This device complies with Industry Canada's license-exempt RSSs. Operation is subject to the following two conditions:
(1) This device may not cause interference; and
(2) This device must accept any interference, including interference that may cause undesired operation of the device.

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes:
(1) l'appareil ne doit pas produire de brouillage;
(2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

China:

注意！
依據 低功率電波輻射性電機管理辦法
第十二條 經型式認證合格之低功率射頻電機,
非經許可,
公司、商號或使用者均不得擅自變更頻率、加大
功率或變更原設計
之特性及功能。
第十四條 低功率射頻電機之使用不得影響飛航安
全及干擾合法通信；
經發現有干擾現象時, 應立即停用, 並改善至無
干擾時方得繼續使用。
前項合法通信, 指依電信規定作業之無線電信。
低功率射頻電機須忍受合法通信或工業、科學及
醫療用電波輻射性
電機設備之干擾。

2. Mobile App

The mobile app *Multi Slider* is used as wireless remote control for the Multi Slider Control Unit.

2.1 Operating Systems

The Mobile App for controlling the motorized Multi Slider is available for Android and iOS Operating Systems.
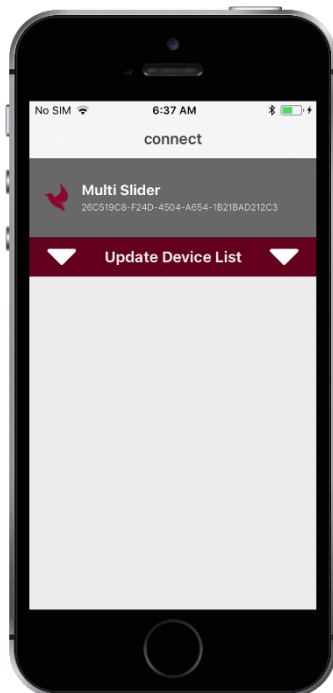
Android

Min. Android Version: 5.0

Google Play Store: https://play.google.com/store/apps/details?id=at.waterbird.multislider

iOS

Min. iOS Version: 10.3

Apple App Store: https://itunes.apple.com/app/multi-slider/id1273882924

2.2 Connecting to Control Unit

The wireless connection to the Control Unit is established via Bluetooth Low Energy (4.0).

Make sure the Control Unit is powered with 12V on the supply connector before you start the Multi Slider App. At initial App start you could be prompted to give necessary permission (e.g. to enable Bluetooth).

During startup, the App scans for the Control Unit. If successful, the Multi Slider is presented on the screen. Connection is performed by touching the Multi Slider entry.

If the Multi Slider Control Unit was not found immediately, assure the Control Unit is powered and its Blue LED flashes. Then restart the scan by pulling down the "Update Device List" bar. Additionally you can try to restart the mobile phone and/or reset the Control Unit.

2.3 System Initialization
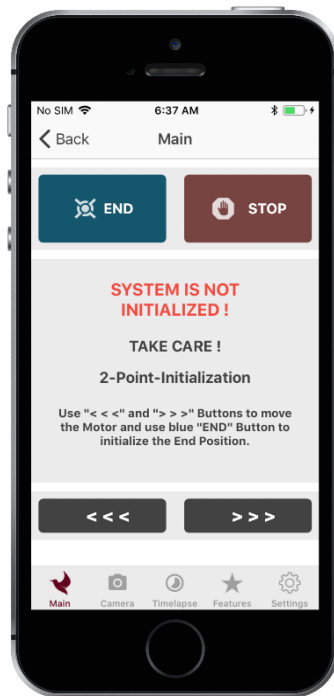
After powering or resetting the Control Unit the system is not initialized. That means the software does not know the position of the slider.

Therefore the endpoints (*HOME* and *END* position) needs to be initialized in order to gain full functionality.

Initialization can be performed by 2-Point (default) or 1-Point initialization. (cf. 2.8 – Initialization Mode)

With the initialization of the Multi Slider, the possible movement area of the slide is bordered by the endpoints. This position area is used for all automated features like Timelapse and Ping-Pong.

Furthermore, once initialization succeeded, it is not possible to move the slide outside those defined endpoints.

Initialization can be cleared by hitting the blue "RESET" button.

2-Point-Initialization

For 2-Point-Initialization the *END* Position needs to be initialized first. Therefore, use the buttons "<<<" and ">>>" to move the slide to your intended END position and hit the blue "END" button.

The label of the blue button changes from "END" to "HOME". So move the slide to your intended HOME position. After hitting the blue "HOME" button the system is initialized.

1-Point-Initialization

If Initialization mode is set to 1-Piont-Initialization (cf. 2.8), then only the HOME position needs to be initialized.

The END position is defined be the position area length stored on the Control Unit. Position and length can be changed by performing a 2-Point-Initialization and saving the controller settings afterwards. (cf. 2.8 – Controller Settings)

2.4 System Control

Once the system is initialized, speed and acceleration can be configured as needed and the slider can be accurately positioned within the initialized endpoints.

Speed and Acceleration Control

For speed and acceleration adjustment there is a slider for rough configuration, and for high accurate adjustment "+/-" - buttons can be used.

The acceleration value is also used for deceleration when moving to a target position.

Speed and acceleration values can also be changed during motor movement and those settings are even valid for features like Ping-Pong and Step-By-Step mode.

Positioning

The "RESET" button clears the position initialization and new endpoints have to be configured.

The "STOP" button immediately stops the motor with a fast deceleration ramp.

With "HOME" and "END"-buttons the slider can be sent to the initialized endpoints.

The position slider offers a live view of the current slider position. Additionally it can be used to send the motor to a dedicated position within the initialized endpoints.

With the touch-and-hold buttons "<<<" and ">>>" the motor moves into the dedicated direction as long as the button is pressed.

Emergency Stop

For emergency stop use the white reset button on the Control Unit (cf. 1.2-6). This can also be used when mobile App is not connected to the Control Unit.

Keep in mind that emergency stop releases power from the motor, therefore in vertical mode motor is not actively held in position. This means that high loads can move downwards, forced by gravity.

2.5 Camera Settings

Shutter

In the Shutter settings the exposure time (in seconds) of the camera has to be defined.

Exposure time is used for timelapse calculations. If this time is set to a value less than the camera needs to take the picture, then the slider might move during camera exposure.

By pressing the "SHUT"-Button the settings can be verified with the connected camera.

Focus

In the Focus settings the camera focus mode has to be defined (Manual Focus or Auto Focus).

If Focus is set to AF, check how long your camera needs to focus the object and set the value (in seconds).

Focus time is used for timelapse calculations. If this time amount is not big enough, the shutter might be triggered before auto focusing is finished.

External Light

For long time timelapse records, it might be helpful to switch on an external light some time before the picture is taken.

Therefore it is possible to connect external controls (e.g. to control a light) to the Auxiliary Connector of the Control Unit.

The time amount in seconds defines the lead time for switching on the light before taking the picture.

By pressing the "ON" and "OFF" buttons correct functionality can be tested.
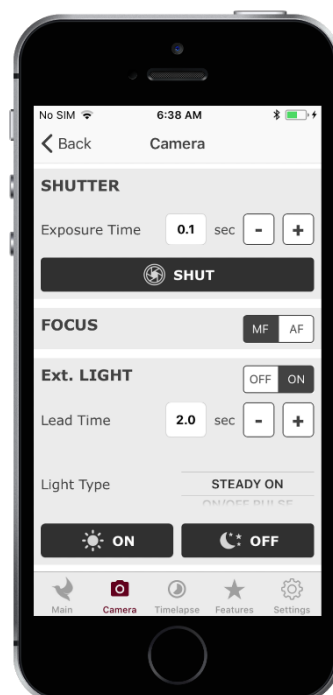
2.6 Timelapse

Timelapse setup is as easy as possible. Just set up Record Time, Movie Length (Duration) or Interval. Picture Amount and Motor Step Length are calculated automatically. Timelapse start and stop positions are the initialized endpoints *HOME* and *END*.

Record Time

This time defines the amount of time for full timelapse record.

Setting Record Time to 0, means endless record time and also a motor step length of 0. This can be used for very long timelapse records without any motorized slider connected (stand-alone Control Unit).

Movie Length

This time is the final length of the time lapse movie, calculated with respect to the defined frames per second (FPS) setup (cf. 2.8 – Timelapse Settings).

In *Duration* mode an exact Movie Length can be defined and Interval time is calculated based on Record Time and Movie Length Setup.

In Interval mode the Movie Length is calculated based on Record Time and Interval Setup.

Interval

The Interval time involves camera exposure and motor movement, and - if configured - also focus time and lead time for external light.

In *Interval* mode an exact time amount for the interval can be configured. If the interval is set to a value that is physically not possible, the font color becomes red and timelapse cannot be started.

In Duration mode the Interval time is calculated based on Record Time and Movie Length Setup.

Pictures

This is the amount of exposures, calculation being based on timelapse configuration.

2.7 Features

Ping-Pong Mode

This mode features infinite ping-pongs between the initialized endpoints *HOME* and *END*. It could be used for interviews.

Delay Time defines the time for resting at an endpoint before starting again towards the other endpoint.

Motor speed and acceleration can be changed in Main section of the app, even while Ping-Pong mode is active.

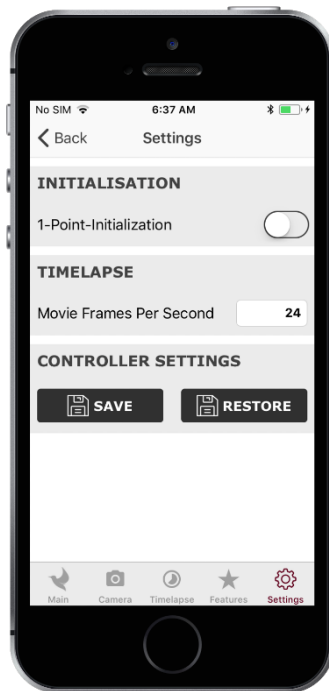This Mode is started using the "∞"-button and it is stopped by pressing the "STOP"-button.

Step-By-Step Mode

This feature is used for "stop-motion" records or basically for moving a defined amount of steps.

By pressing "←" and "→"-buttons the motor moves the configured step length into the dedicated direction.

2.8 Settings

Initialization

Initialization mode can be configured as 1-point or 2-point. Details are described in chapter 2.3.

Timelapse

For calculating of the final movie length of timelapse records, the FPS setting is used.
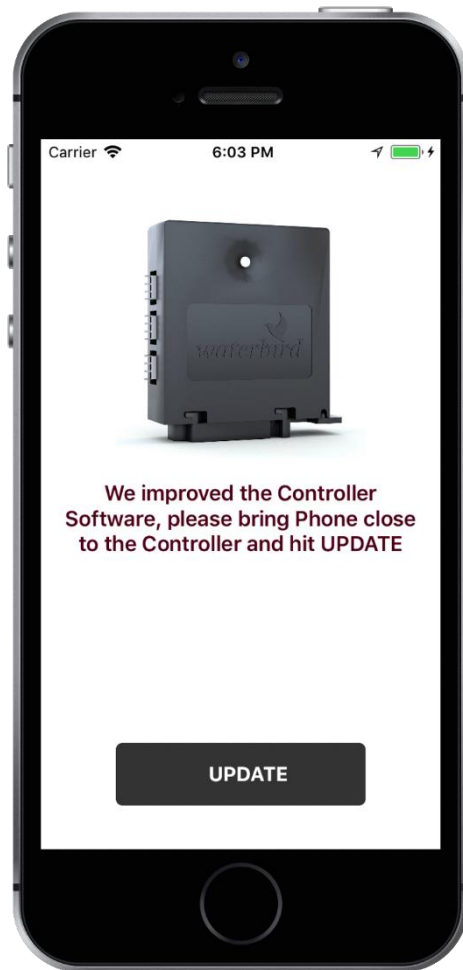
Controller Settings

Hit "SAVE"-button to permanently store the current parameters of the Control Unit like slider length or camera settings.

To restore factory settings of the Control Unit use the "RESTORE" button.

2.9 Control Unit Firmware Update

From time to time the firmware of the Control Unit will be updated with new innovative features.

Before starting the update, make sure you connect your mobile device to power supply. It is also recommended to switch off mobile data and WIFI connections, as the update process must not be interrupted.

With iOS devices the update will take around 3 minutes. Depending on the Android device it might take up to 6 minutes.

Do not close the update screen or lock the device while the update process is ongoing.

If the update fails or if it is interrupted (e.g. by external calls), it needs to be restarted.

With some Android devices the update process fails permanently. Please use an Apple IPhone or try another Android device for updating the Control Unit.