Instruction for Use
eMotimo TB3 Black - Firmware Version R1_1_109

Table of Contents

Additional References

Quick Start Guide

http://emotimo.com/wp-content/uploads/2013/09/TB3-QSG-5_13_13-spread.pdf

Instructional Videos

http://emotimo.com/learn/tb3-instructional-videos/

Downloads page

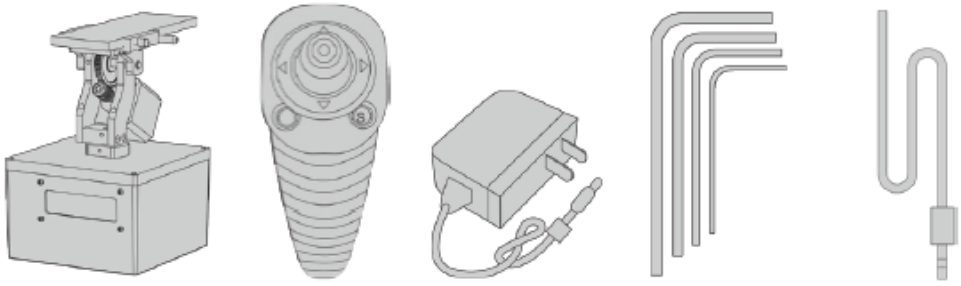
http://emotimo.com/downloads/

FAQS

FAQS: http://emotimo.com/emotimo-faqs/

Setting up your TB3

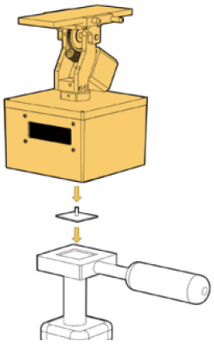
Parts included and needed for setup:



A B C D E

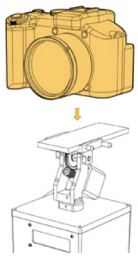
A) TB3
B) Remote (wired or wireless): For controlling TB3 and setting parameters
C) AC Adapter: Powering the TB3
D) Tool Kit: Keeping your TB3 in prime working order
E) Camera Shutter Cable: Controls the cameras shutter from the TB3

Hardware Setup:

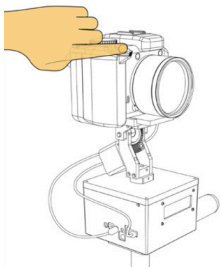


1) Mount your TB3 to a sturdy platform. We recommend using a tripod, ball head, dolly, cart, etc. If what you are mounting it to has a quick release mount, we recommend attaching that to the TB3 first. Once the TB3 is secure, level the TB3 to the ground.

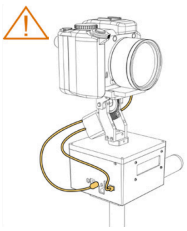
⚠ Warning: Don't use the TB3 without securing its base. It can tip over, damaging it and your camera equipment.



2) Mount your camera to the TB3. Tighten down the camera to the sliding plate using the thumbscrew and point the camera in line with the sliding plate. Balance your rig by using the sliding plate. Once your have balanced you camera and lens, lock down the sliding plate.

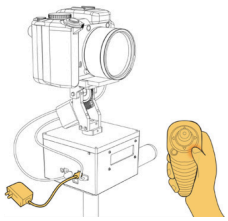


3) Take a test shot. Set your camera to manual mode and take test shots to get the right exposure and focus. Make note of the exposure time, as you will need this to properly set “Static Time”.

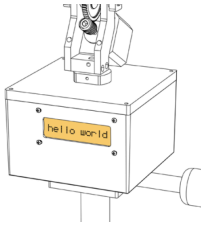


4) Connect cables. With the unit powered down, connect the tilt motor cable to the TB3. This cable is coming out from the bottom of the tilt motor and it connects to the “tilt motor” port. Connect camera and TB3 to the camera shutter cable (not required in video mode). If using 3rd-axis, connect additional motor to the “Aux Step Port”.

WARNING: Always have the unit powered down when you plug in or remove motor cables. The stepper drivers can be damaged if the unit is powered up when you plug it in.



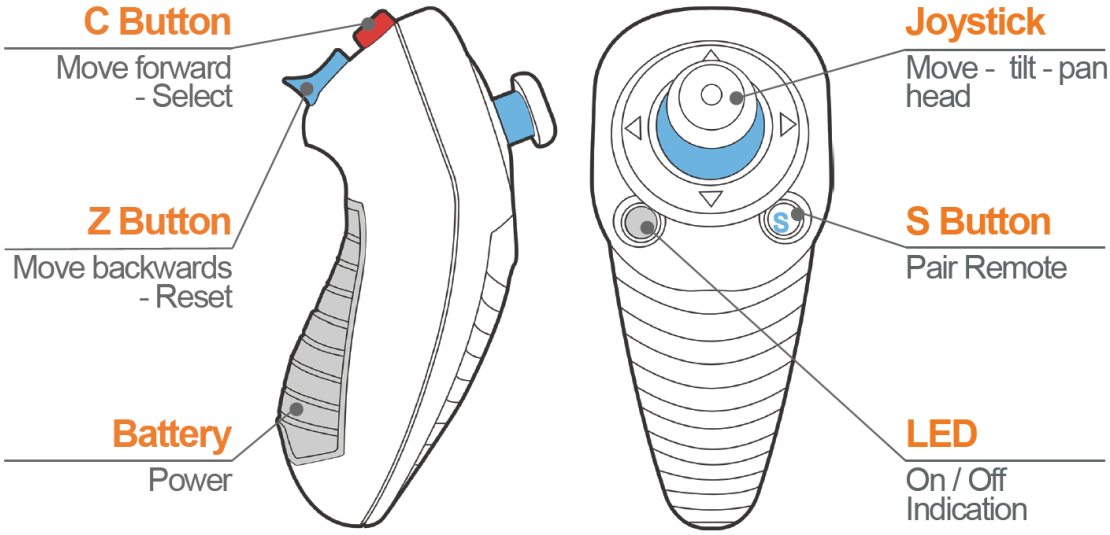
5) Power the TB3 on. Connect power cable. Connect the 12-volt DC source to the power port on the side of eMotimo TB3. You may supply eMotimo TB3 with a voltage of 10-14 volts DC. The TB3 comes with an AC adapter that will power your unit well. Plug this power supply into the wall and the barrel connector into the side of the TB3. If using the wireless remote, connect the remote by pressing the small "S" button the remote's face.



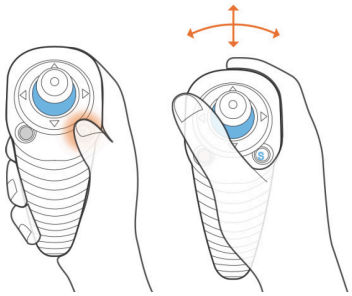
6) You are now ready to setup your first shot. Skip to TB3 menu options to learn more.

Controls:

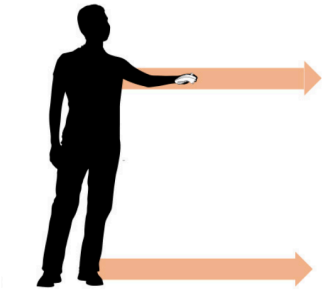
Remote Features:



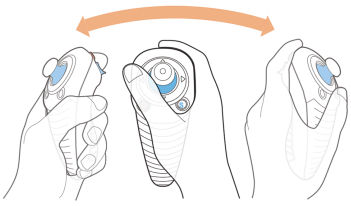
Remote in-use:



Press “S” button to pair the remote to TB3. Control the pan and tilt axis by pressing left/right and up/down on the joystick with thumb.



When using the TB3 with the wireless remote, hold wireless remote parallel to ground.



To control the 3rd-axis (when using an auxiliary motor), rock the remote from left to right to move the auxiliary motor forwards and backwards.

TB3 menu options

New 2-point move:

This is a shot that is defined by 2 points, a start point and an end point. In this program, you define each point, creating this move profile. During the move, the TB3 will travel in a strait path between the two points you define.

Move to start point*:

Use the remote joystick to pan and tilt until you have framed the starting point of the shot. If you are using the 3rd-axis, rock the remote to control the aux motor's position. Once you are satisfied with the start-point, hit "C" to continue.

Move to end point*:

Use the remote joystick to pan and tilt until you have framed the ending point of the shot. If you are using the 3rd-axis, rock the remote to control the aux motor's position. Once you are satisfied with the end-point, hit "C" to continue.

Rev 2-point move:

A rev 2-point move means you are setting up a 2-point move where you set your end point first and your start point second. Some prefer this option to save on power when setting up long sliding moves on a dolly.

*See remote in-use section (p. 6) to ensure you are holding the remote correctly

⚠ WARNING: eMotimo TB3 does not have limits for the Pan and Tilt Axis. During moves on setup, and during the program, watch for interference with:

1. The Camera Lens/Body and eMotimo TB3 or other objects.
2. The Shutter Release Cable attached to the Camera body and eMotimo TB3
3. The tilt cable wrapping and pulling from eMotimo TB3
4. Shifting camera weight causing an imbalance and tipping over the rig.

Interval:

Interval is your frame rate for timelapse or stop-frame animation. If you select a 2.0 second interval, the eMotimo TB3 will trigger your camera to start a shot every 2.0 seconds. If you want to speed time more, select a longer interval (good for shots taken over a long duration of time). If you want to speed time less, select a smaller interval (good for shots taken over a short duration of time). Interval time always needs to be set longer than the exposure time set on your camera. **TIP: When shooting long exposures, set your interval to twice your cameras shutter speed.**
For more tips on setting interval see *Anatomy of a Shot (p.16).*

Ext. Trig:

To access external trigger, scroll all the way down in the interval prompt to "Ext. trig" mode. This mode allows your camera to talk to the TB3 and tell it when to move based on when the camera shutter closes. This allows you to control your camera with an external trigger, while the camera controls the TB3, which

handles the movement of the shot. In other words, this makes the TB3 compatible with external triggers. This mode can be used for a variety of unique shots, including bulb ramping. It will work with such devices as Ramperpro, Promote Control, and Timelapse +. To access this mode, scroll all the way down in the interval prompt to “Intval: Ext. Trig”. Select this option.

When shooting in this mode, you can still select the rest of your program parameters (start-point, end-point, shot duration, static time, ramp, and lead-in/out). Once the sequence has begun, your TB3 will move only when triggered by your camera.

For hardware compatibility, your camera will need to be connected to the TB3 using the Camera PC Cable (http://store.emotimo.com/camera-pc-cable-p42.aspx). If your camera does not have the PC port, then you can also pick up the Hot Shoe Converter (http://store.emotimo.com/hot-shoe-converter-p43.aspx) to give your camera that functionality.

Video:

Want to shoot video? Scroll all the way down in the interval prompt to “Intval: Video”. Select this option. Instead of moving in a shoot-move-shoot fashion, video mode will allow the TB3 to travel continuously though your move profile. For this option you do not need to have a camera shutter cable or worry about static time. **TIP: 2-point moves will be smoother than 3-point moves for video.**

Move Duration:

For SMS (shoot move shoot), select how many frames or how much time you want your shot to take. Based on what you set your interval at and how many frames you want in your shot, the TB3 will calculate how long your shot will take to complete in real time.

For video, select the time you want your move to take from start to finish. **TIP: if you are doing a fast move, pay attention to the LCD. If the LCD reads, “program running, speed limit” the move will not be time accurate. This means, the TB3 is running at its max speed.**

Static Time:

Static time is the amount of time the TB3 remains stationary while triggering your TB3. As a rule of thumb, take your camera’s exposure time and add 0.1 seconds onto it. For example, if you are shooting a 2.0 second exposure, select a 2.1 second static time. If you are shooting daytime shots with 1/100th sec. exposure, use default of 0.1 seconds static time.

Ramp:

Ramp controls how smooth your starts and stops in your final footage are going to look. A low ramp means you are going to have an abrupt start and stop and a high ramp means you will have a very smooth start and stop. The number you

select for your ramp is the number of frames in the final footage that show acceleration and deceleration. If you have 50 frames of ramp, you will have 50 frames at the beginning of your shot and 50 at the end of your shot where the footage shows acceleration and deceleration. If you are shooting in video mode, your ramp will be represented as a percentage. This will be the percentage at the start and end of your shot that is ramped.

Lead-in/out:

Stationary lead-in/out is the number of stationary shots at the beginning and end of your programmed move. For example, if you set “24 in 48 out”, your program will have 24 shots at the start and 48 shots at the end where the camera and TB3 are not moving. If your frame rate is 24 FPS, then you can think of it as 1 second of stationary time at the start of your shot and 2 seconds of stationary time at the end of your shot.

Select Shot Type (Continuous Loop):

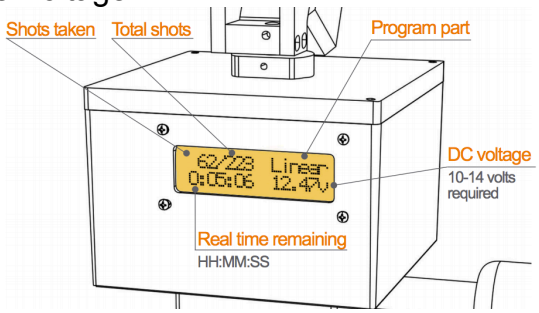
Define whether you’d like to run a shot once or run a shot continuously. If you select Continuous Loop, your shot will repeat and reverse until directed otherwise. To exit continuous loop mode, hold “C” and “Z” at the same time. **TIP: Continuous Loop is great for parallax moves to allow your TB3 to perform as a robotic cameraman.**

Review Screen/Start Delay/Program Running:

Review your settings and press “C” to immediately start your program. If you would like to add a “Start Delay” to your shot you can do so as well on this screen. Start delay allows you to start your shot after a specified amount of time. Jog the joystick up and down to set “Start Delay”. Once you have selected your Start delay, press “C” to start your program. If you would like to exit the delay to 5 seconds remaining, hold down “C” and “Z” and the same time. You can continue to hold down “C” and “Z” to stay at a 5 second delay until the buttons are released.

In program, the LCD will give you feedback on where it is in the Shoot. It will update once every shot with:

Upper Left: Current Shot/Total Shots
Upper Right: Program Stage (LeadIn, RampUp, Linear, RampDn, LeadOT)
Lower Left: Time Remaining in HH:MM:SS
Lower Right: Source Voltage



In-Shot Menu:

If Pause in enabled, during a SMS (shoot-move-shoot) shot press “C” and “Z” at the same time during the move to pause the shot and access the in-shot menu. Once in this menu you can either resume, restart, go to end point, go to a specific frame within your shot, or change your interval. To move through the options, press up or down on the controller. To confirm a selection press C, and to cycle through the values within a range scroll Left/Right.

In Shot Menu Options Available:

Restart (Select C)
Go To End (Press C)
Go to Frame (L/R to select frame) Press C
Interval (L/R to change values – C to select)

Pro Tip: The TB3 won’t send any triggering signals during pause. Therefore, depending on the length of your pause, you may notice strange, undesirable gaps in your final compiled footage.

Repeat – C Reverse - Z:

Once your program is complete you will be prompted to either repeat or reverse it. If you repeat the program, then your following move will be the exact same as the previous one. To repeat the program, press “C”. If you reverse the program, then your following move will be your previous move shot in reverse. To reverse the program, press “Z”.

New 3-point move:

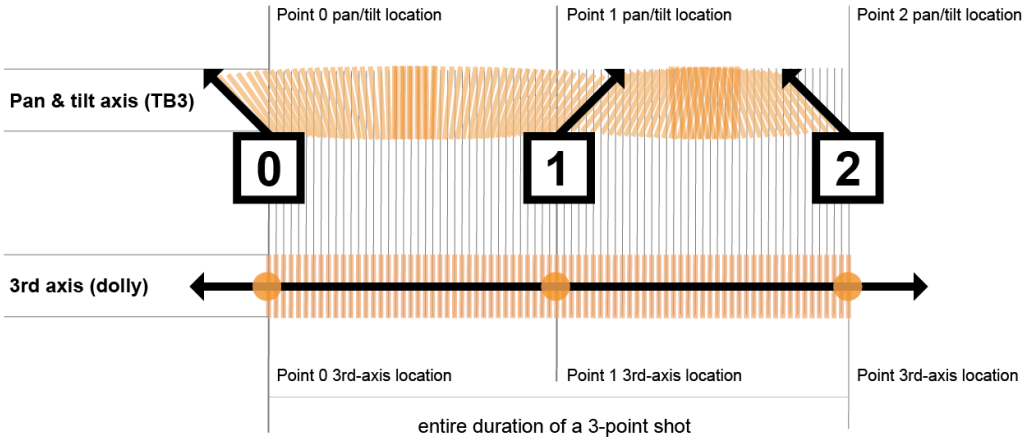
A 3-point move means you are setting up a shot that moves through 3 points: a start-point, a mid-point, and an end-point. You choose all three points on this move profile and the TB3 creates an arc from the start-point, through the mid-point, to the end-point. Depending on where you position your mid-point, your shots will have dramatic arcs, or very subtle ones. To select a 3-point move, scroll down in the starting menu to “New 3-point move”. Press “C” to continue. After choosing your 3-points, setting all other parameters is the exact same as a 2-point move.

Important note:
-3-point video moves are close, but not time accurate for video.

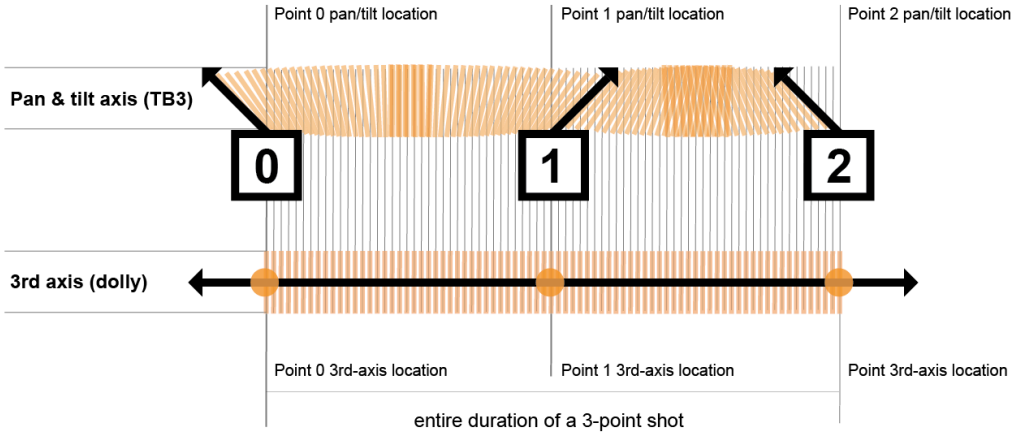
When shooting a 3-point move on all 3 axis, the AUX axis will only hit the start point and the end points. In other words, the AUX axis will not hit the mid point on a 3-point move. Furthermore, **the mid-point on your pan and tilt will always be at the halfway point in the number of frames selected for the shot.**
Please see examples A and B below:

Example A)

Shot setup: The mid-point (point 1) is set halfway through the entire 3rd-axis (AUX port) move.

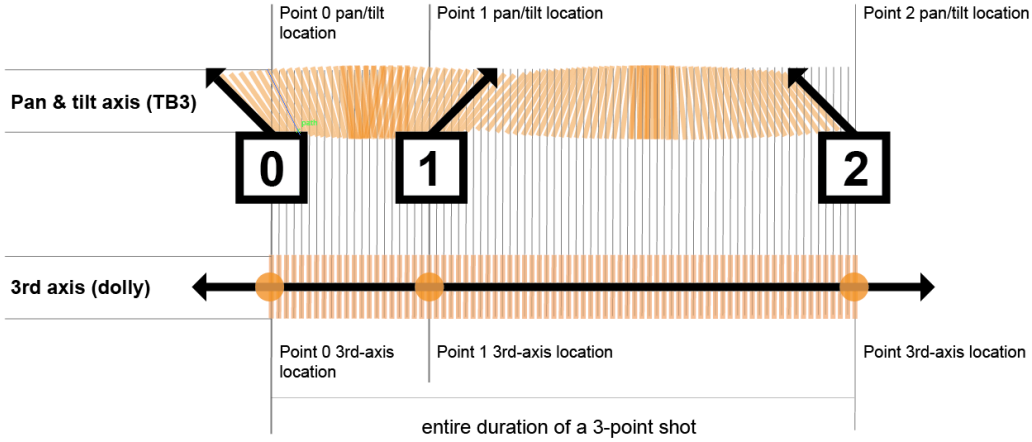


Shot outcome: The outcome of this shot is the same as the way it was set up, with the mid-point exactly halfway through the entire move.

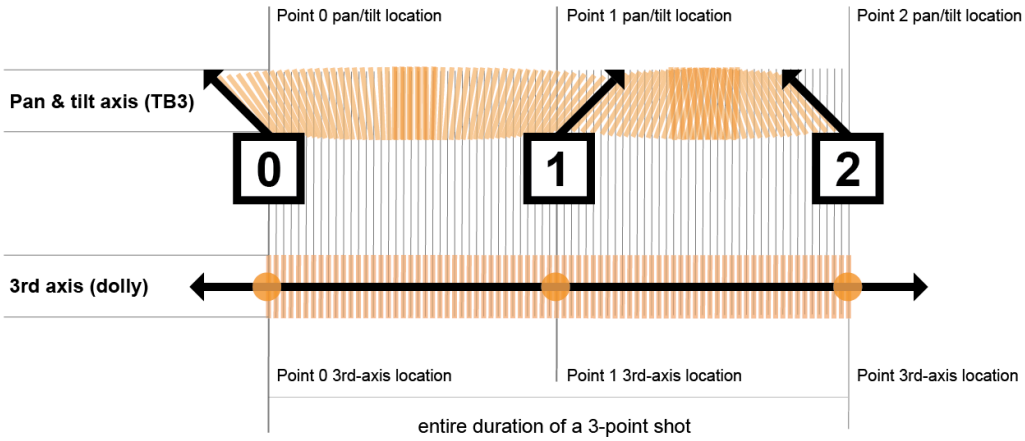


Example B)

Shot setup: The mid-point (point 1) is set ¼ of the way through the entire 3rd-axis (AUX port) move.



Shot outcome: The outcome of this shot is different from the way it was set it up. Please see below for what the outcome of this move will actually look like. The mid-point of a 3-point move will always be halfway through the entire move.



Rev 3-point move:

A Reverse 3-point move means you are setting up a shot that moves through 3 points, where you set your end point first, your through point second, and your start point third. Some prefer this option to save on power when setting up long sliding moves on a dolly.

Panorama:

The Panorama program allows you to capture multiple row/column panoramas using the TB3. To select Panorama, scroll down in the start up menu to “Panorama”. Press “C” to continue.

Set First Corner / Angle Of View (AOV) Definition – Set Pan/Tilt AOV:

When shooting overlapping panorama images, we need to tell the TB3 what your camera can see. This term is called Angle of View. If you are shooting with a wide-angle fish eye, you might get an angle of view of 100 degrees or more horizontally. If you are shooting with a zoom lens on a crop-framed sensor, you might only get an angle of view of 2-3 degrees. Because of all the things that affect what your camera can see (sensor size, focal length of lens, % of viewfinder covers, camera manufacturer), it would be really hard to just enter a focal length and come close to accurately defining how much of the world you capture in a single frame.

Set First Corner:

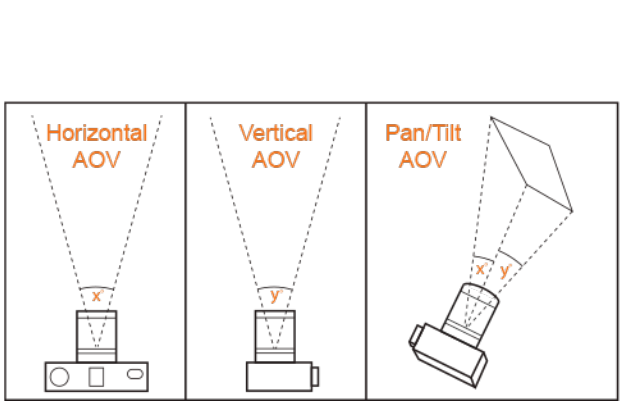
Our solution is for you to define the Angle of View by looking through your camera’s lens to set a couple of points. Start by setting your first corner. To do this we need something sharp that we can put at one corner of you viewfinder. The corner of a building, or a mountaintop in the distance works well.

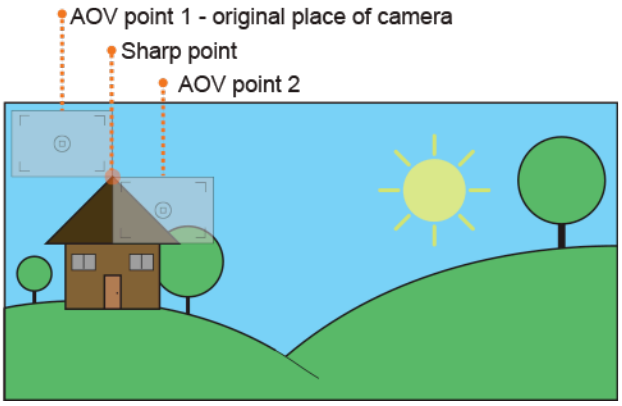
Set AOV:

With this sharp point at one corner, by moving completely across the frame diagonally and putting that sharp point in the opposite corner, you are telling the TB3 the pan and tilt Angle of View. As you are moving to the second point, the TB3 gives you feedback on how many angles you have moved for both Pan and Tilt.

TIPS–

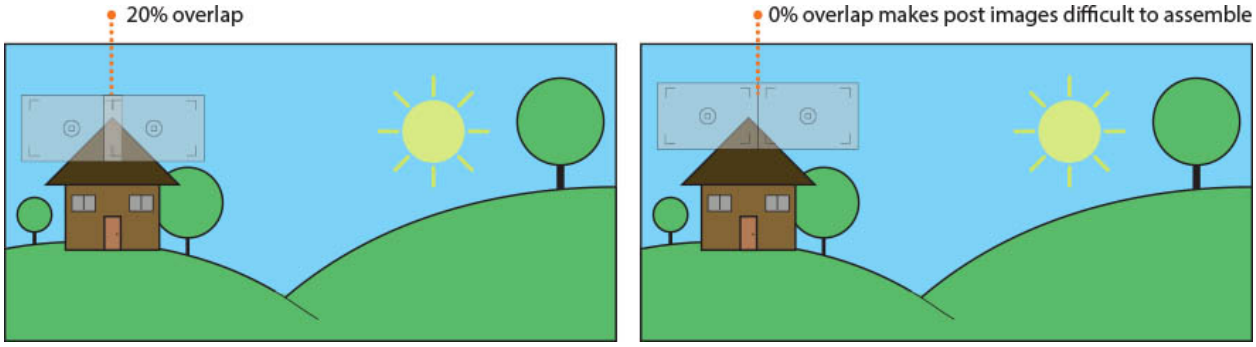
- Use a sharp point far away from the camera like a house or mountaintop in the distance. If you use a fencepost 3 feet from you, it won’t be as accurate.
- Turn on your Live View function. If you don’t have a 100% viewfinder, the corners will move slightly, making you angle of view less accurate.





% Overlap:

Select the percent of overlap you hope to achieve with your photos in your panorama. Having your photos overlap will make stitching together these images in post more manageable. Please note that the percent of overlap you select (e.g. 20%) will be the minimum overlap percent between photos. Depending on how you frame your entire panorama, this overlap may change for the greater.

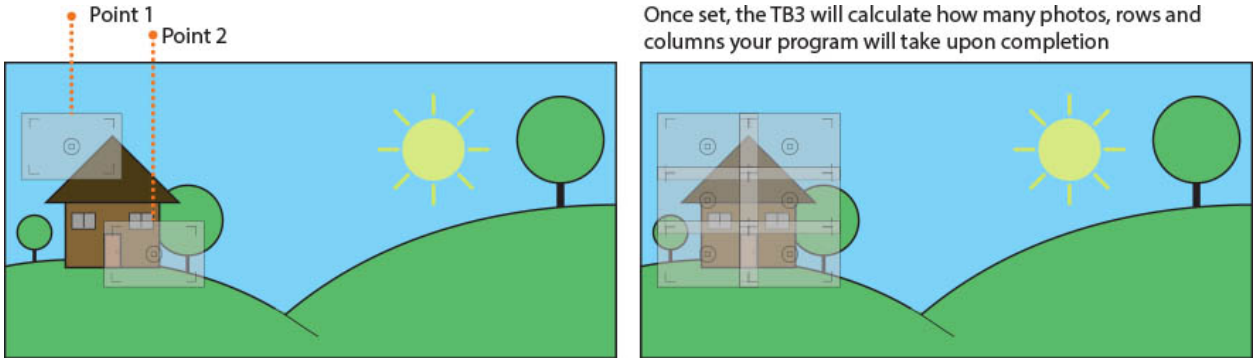


Move to point 1:

Use the remote joystick to pan and tilt until you have framed the first shot of your panorama. Once you are satisfied with the first frame, press “C” to continue.

Move to point 2:

Use the remote joystick to pan and tilt until you have framed the last shot of the panorama. Once you are satisfied with the last frame, press “C” to continue.

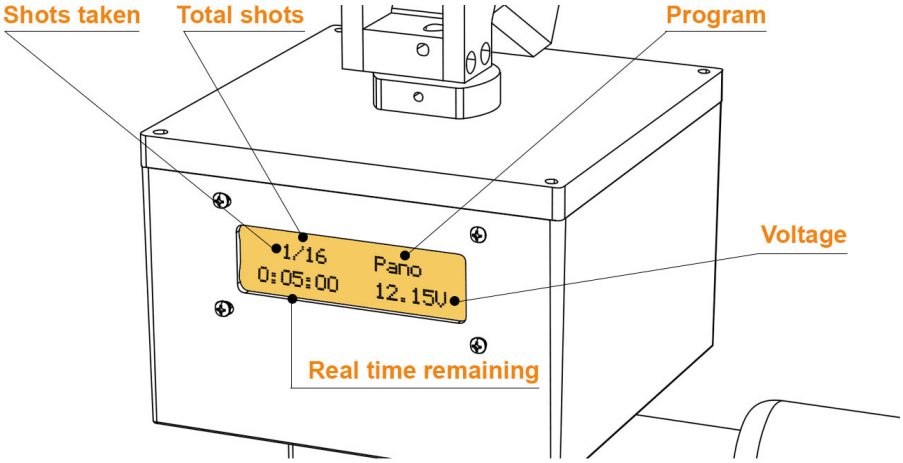


Static Time:

Static time is the amount of time the TB3 remains stationary while triggering your TB3. As a rule of thumb, take your camera’s exposure time and add 0.1 seconds onto it. For example, if you are shooting a 2.0 second exposure, select a 2.1 second static time.

Review screen/Program running:

Review your settings and press “C” to start your program. In program, the LCD will give you feedback on where it is in the shoot. It will update once every shot with:


Shots taken
Total shots
Program
Voltage
1/16
Pano
0:05:00
12.15V
Real time remaining

Portrait Pano:

The Portrait Panorama program allows you to shoot shallow depth of field panorama portraits, also coined as the Brenizer method from Ryan Brenizer,. The outcome looks surreal and photoshopped when in fact is optically untouched.

Angle Of View:

See Panorama section, page 13.

Overlap:

See Panorama section, page 14.

Move to Subject:

Using the joystick move the TB3 to the center the camera on your subject. This is where your first shot will be taken. When shooting portraits, we recommend focusing on the face for the first shot.

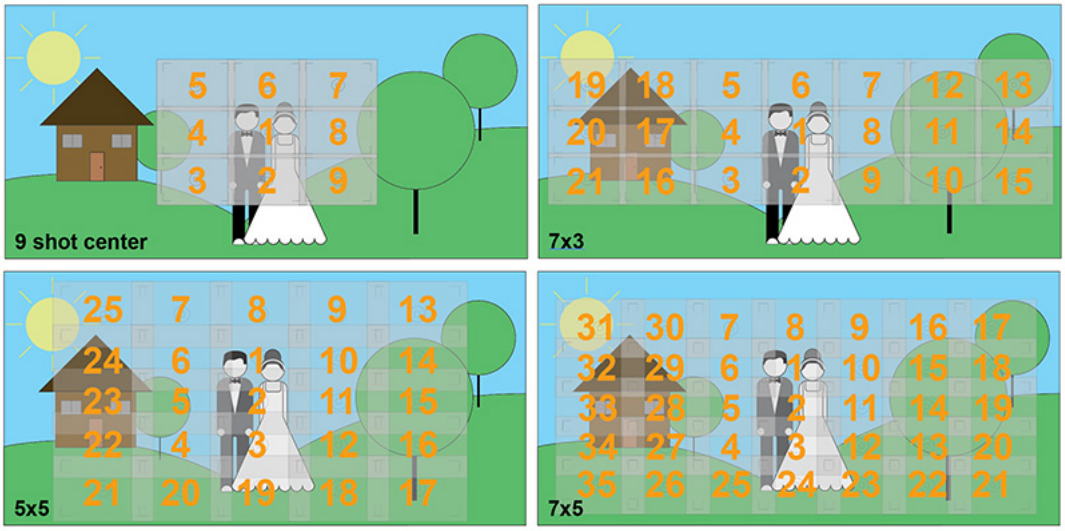
-WARNING: the TB3 will run into the edges. Be mindful of your AOV and shot array size.

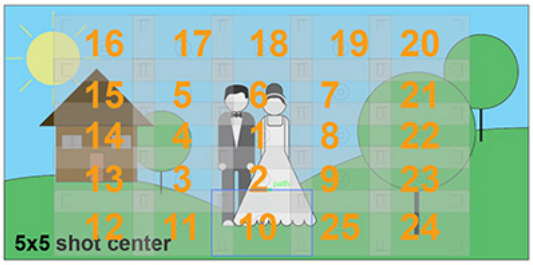
Set Array Type:

Choose the array you would like to take with your camera. Please see below for a graphic representation of each array shot pattern.

In TB3 Menu:

9 Shot Center (3x3)
7/3 Matrix
5x5 Top 1/3
7x5 Top 1/3
25 Shot Center




16 17 18 19 20
15 5 6 7 21
14 4 1 8 22
13 3 2 9 23
12 11 10 25 24
5x5 shot center

DF slave mode:

With DF slave mode you can program your TB3 using the Dragonframe software. To do this, you first plug in your TB3 to your computer using the USB port. This will power on your TB3. You must also plug in the AC adapter, or 12V power source or the motors will not move. Once your TB3 is on and powered, select "DF slave mode" by scrolling down in the starting menu to "DF slave mode". Press "C" to continue. On your computer, open up the Dragonframe software and configure the ArcMoco connection.

Important notes/resources:

- The TB3 LCD and joystick are not active while being used in this mode.
- Occasionally, on the MAC OS, when connecting to ArcMoCo #1 in Dragonframe, the TB3 will automatically restart. If you notice this happen, don't unplug your TB3 or shut down the Dragonframe software. Using the joystick, set the TB3 back to DF slave mode to continue.

Setup Menu:

In the setup menu, you can adjust general TB3 settings. To access the setup menu, scroll down in the starting menu to "Setup Menu". Press "C" to continue.

Aux Motor: On/Off:

If you are using a 3rd motor (AUX port), you will need to make sure the Aux Motor port is turned on. Scroll up or down to switch between on and off. Press "C" to select.

Pause:

By "Enabling" the pause button, you can pause the TB3 during a sequence. Scroll up and down to change between "enabled" and "disabled". Press "C" to select. If pause is enabled, press "C" and "Z" at the same time to pause the TB3 during a shot.

PT Motors on:

How your TB3 manages power for your pan and tilt motors.

Shoot (Pwr Save):

This means power down at all times except for the move - This saves a lot of power for many types of shots, but could be less precise for long lens shots - This is a great mode if you are really trying to extend your times. Run times can be increased several fold with this mode!

Shoot (accuracy): Recommended

This means power down when static time (shutter) not engaged - Good for most PT settings.

Program:

This means power down only at the end of a sequence, but on during the rest of the time. Should rarely/if ever be used for the Pan Tilt motors.

Always:

This means no power down, even after a shot sequence completes- uses the most power and should only be used on AC (mains)

Aux Motors on:

How your TB3 manages power for your Aux motor.

Shoot (Pwr Save): Recommended (level/flat shots)

This means power down at all times except for the move - This saves a lot of power for many types of shots, but could be less precise for long lens shots - This is a great mode if you are really trying to extend your times. Run times can be increased several fold with this mode!

Shoot (accuracy):

This means power down when static time (shutter) not engaged - Good for most AUX shots if going level or shallow or using a strong motor (like a 27:1 gear ratio) in some vertical shots with lighter rigs.

Program:

This means power down only at the end of a sequence, but on during the rest of the time. This is good for doing steep dolly moves where you want to hold position between shots. Should be used only selectively with the AUX as this can use A LOT (10 to 20x more power is not out of the question) based on your shot types.

Always:

This means no power down, even after a shot sequence completes- uses the most power and should only be used on AC (mains)

BKLite On Run:

BKLite on run means you are setting up the brightness of the LCD when the program is running. It is important to note that the brightness will not change when setting up parameters; it only changes during the shot. In the prompt, by scrolling up and down on the joystick, you can control the brightness of the LCD screen. 1 is the darkest setting and 8 is the brightest setting. This setting is helpful when shooting in very bright or very dark environments.

Max Speed:

Change your motors speeds. Speeds range from 2,000 – 20,000 steps per second. If you max out the speed to 20,000 steps/second you may stall out your motors. The motors won't damage if stalled, but if stalled they won't remember their position and will need to be reprogrammed.

Aux Reversed:

Inverse control for your aux motor. By turning the Aux Reverse on, you will control your 3rd axis (AUX Motor) by rotating the remote in the opposite direction it was originally controlled in.

Powering your TB3

AC Adapter:

The TB3 ships with an AC adapter that plugs from a U.S. wall outlet to your TB3. This is a 12-volt DC source and connects to the TB3 with a 2.1 mm barrel connector. You may supply eMotimo TB3 with a voltage of 11-14 volts DC.

Battery:

If using one of our optional batteries, make sure it is set to 12V and connected correctly. If you want to pick up your own battery, here are some general rules of thumb:

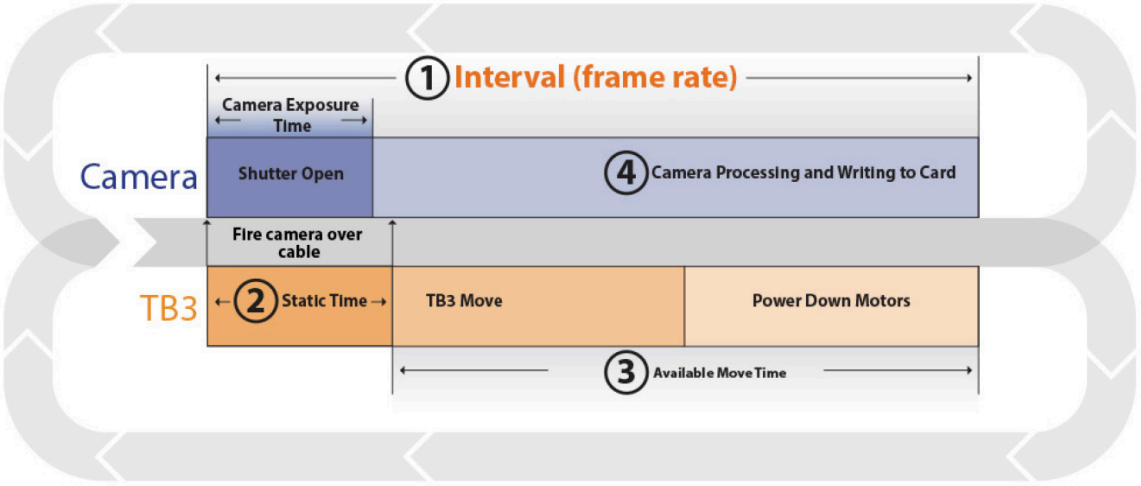
- Input Voltage 11-14 volts
- Current for the TB3 - .80 Amps Pan and Tilt. 0.4 Amp if you unplug the tilt motor. Depending on if you plug in the 3rd motor and how you drive it, current requirements can increase to up to 1.5 Amps.
- Connector – 2.1mm x 5.5mm x 12mm Barrel Connectors – center positive.

Tips for setting up your first shot

Camera setup recommendations:

- Turn on camera. Is the battery level full? Always start with a full battery.
- Set the camera to M (Manual) mode.
- Set the camera to single shot mode. Rapid fire can result in unexpected results.
- Set the white balance to the correct manual setting (sky, cloud, indoor). Note: do not set WB to AWB or you will get flickering color changes as the white balance changes during the shot.
- Set camera ISO setting to a manual setting. Use the lowest possible ISO for your exposure.
- Set the aperture as desired. Low, if you want a purposeful shallow depth of field or have low light conditions. Choose higher aperture values for sharper focus and a wide depth of field.
- Set the shutter to expose correctly for the conditions. The goal is keep most pictures exposed within about 1 stop of correct exposure. If you change exposure during the sequence, it will be noticeable in the final film by camera shake and/or jumps in lighting that are almost impossible to correct in post.
- Put camera in manual focus mode. Take and review a test shot to ensure your subject is sharp. Autofocus should never be used.
- For those that are just starting off, set the Size/Quality to Small/Fine. Bigger is not necessarily better. We don't need 18 or 21 MP shot to make time lapse high definition movies. It will eat memory and take a lot longer to edit! Use small fine JPGs, or whichever setting will get you as close to high definition footage as possible without going to a resolution of 1920x1080. This equates to about a 2MP picture. Disregard if you are a pro and are going for 4K imagery.
- Take a couple sample pictures and review the exposure and verify your focus once again.
- Set LCD Review time to off. This saves the camera battery.
- Check to make sure the camera trigger cable is seated well in both your camera and the TB3's camera port.

Anatomy of a shot:



Notes:

1. Interval is the time between shot starts.
2. Set static time slightly longer than camera exposure time to prevent movement while your camera has its shutter open.
3. Interval time - Static Time = the available move, settle and sleep time for the TB3. It is also the time in which your camera processes your images and writes them to your card. You typically want to allow for at least 1.0 seconds of time to move and settle.
4. For long exposures your camera may need a long time to process and write to your card. Setting your interval too short is a common mistake that results in missed frames.

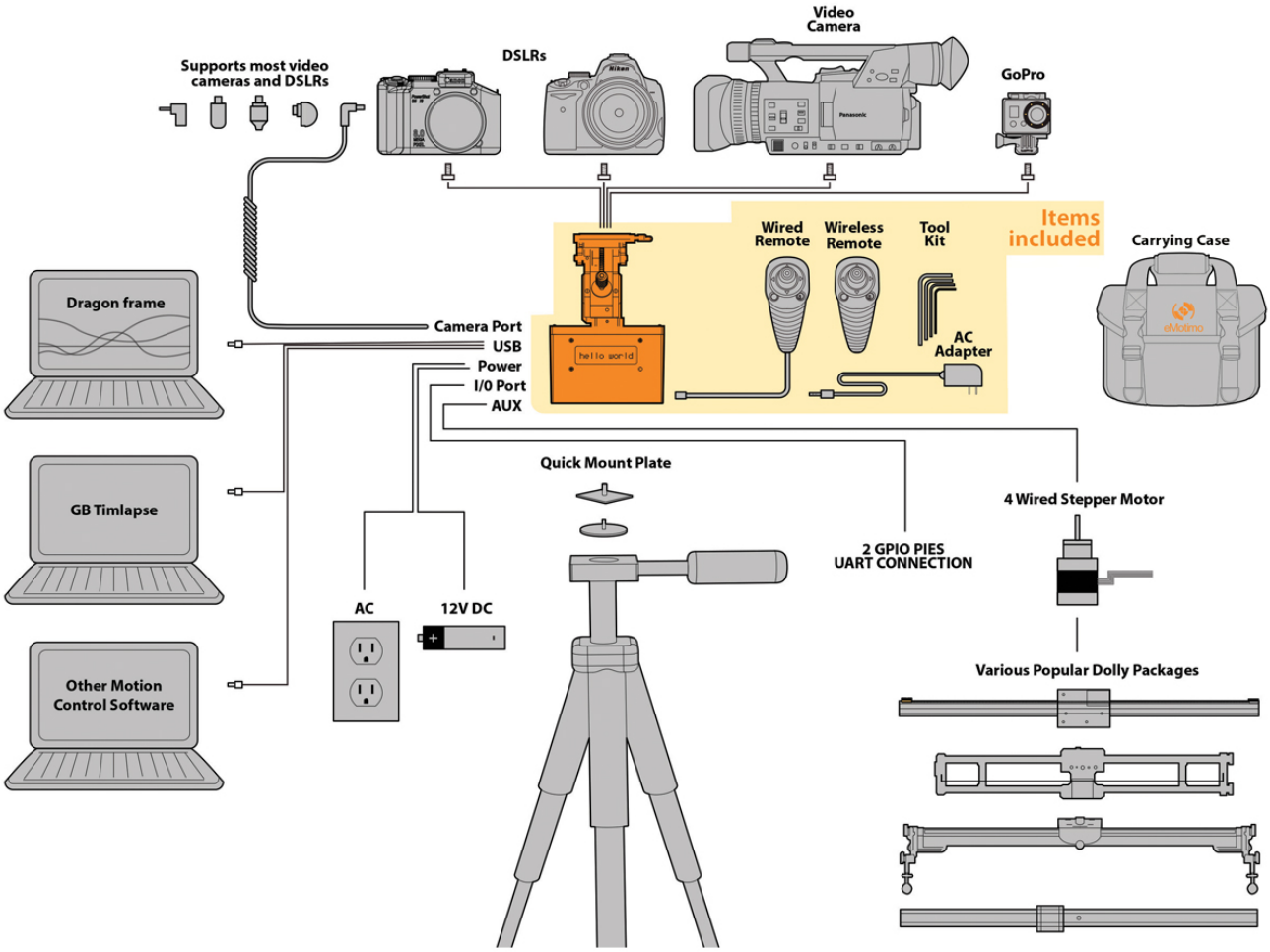
Example parameters:

Setting	Daylight Shot	Astro Shot	HDR Shot
Motion *	135 degree pan 15 degree tilt	90 degree pan 35 degree tilt	35 degree pan 10 degree tilt
Camera Exposure	1/100 sec.	15.0 sec.	3 shot bracket - takes 7.0 second to complete.
Interval	2.0 sec.	30.0 sec.	10.0 sec.
Static Time**	0.1 sec.	17.0 sec.	8.0 sec.
Ramp	50 Frames	50 Frames	50 Frames
Duration/Frames	20 min / 600 frames	3Hours, 20 min. 400 frames	60 min 360 frames
Lead In/ Lead Out	5 / 5	5 / 5	5/5

* Start with small moves to understand the process. Large moves with low numbers of frames can look very choppy.

** Never choose a static time that is lower that your camera's exposure time or you will get motion blur.

Product Map:


Video Camera
Supports most video cameras and DSLRs
DSLRs
GoPro
Items included
Wired Remote
Wireless Remote
Tool Kit
AC Adapter
Carrying Case
Dragon frame
Camera Port
USB
Power
I/0 Port
AUX
GB Timlapse
Other Motion Control Software
Quick Mount Plate
AC
12V DC
2 GPIO PIES UART CONNECTION
4 Wired Stepper Motor
Various Popular Dolly Packages

Limited warranty

This does get updated from time-to-time. Therefore, please review all of our most up-to-date warranty information on our Terms of Sale page here: http://emotimo.com/terms-of-sale/

For support or sales related inquiries, please reach out to us at: **support@emotimo.com**