



Ultratm SERIES

Operating Manual

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*Most of this manual is written for experienced Steadicam operators.
If you are new to Steadicam operating, or you have never taken an intensive Steadicam workshop,
we strongly urge you to take one of our five or six day workshops.
For more information on professional workshops worldwide,
contact The Tiffen Company or the Steadicam Operators Association.*

Overview

The Tiffen Company takes great pride in producing the world's most advanced Steadicam®, the Ultra™.

We are committed to excellence and innovation, and the Ultra is a system that can and will grow with you.

Each component of the Ultra is carefully designed so the operator can easily configure the Steadicam to the best possible advantage for each shot.

All adjustments are tool free, so that the features can be used under real-life, fast-paced conditions.

The Ultra's modular design makes the sled easily modified, serviced, and upgraded.

Perhaps the most obvious new feature is **the four section, carbon fiber telescoping post**.

With these posts, the operator can quickly extend the sled from 28 to 72 inches – or anything in between – for ultra high or ultra low mode shooting.

The integral tilt head maximizes the usefulness of the telescoping post. It works to preserve dynamic balance in both regular and long modes, and it helps with clearance, reach, or viewing problems. With the tilt head, the operator can even execute precise whip pans with the lens angled up or down as much as 20 degrees.

Both the monitor and the battery are supported by **bracket systems with dual carbon fiber rods**. These systems are extremely rigid and provide a greater range of extension than ever before. The operator has much greater control of the sled's inertia as well as increased flexibility in viewing the image.

The Ultra's 55 watt hour, **high capacity and lightweight 28.8 volt NiCad battery pack** provides plenty of power for the sled and today's power hungry 35mm cameras.

The new stage motor transmitter and receiver increases the precision of every shot. The Ultra is the only sled in the world that can be trimmed while shooting.

The innovative stiffening system creates extra rigidity whenever violent moves, a rough ride, or a very long post configuration requires some help. The lightweight and unobtrusive spreader and stays system can be installed in less than a minute.

The Palm Pilot® Dynamic Balance Computer contains a customized program that is specifically tuned to the Ultra sled. This computer - and the design of the Ultra - work together to make finding and preserving dynamic balance simple and fast.

The improved isoelastic arm is a joy to use. Very little effort is required to boom all the way up or down and the sled is much less reactive to vertical changes or vibrations.

No additional accessories or duplicate parts are required for any configuration. All the features are integral to the design, ready to be used when you need them.

Quite simply, the Ultra is the most versatile and the most user-friendly Steadicam ever made.



The Ultra Sled



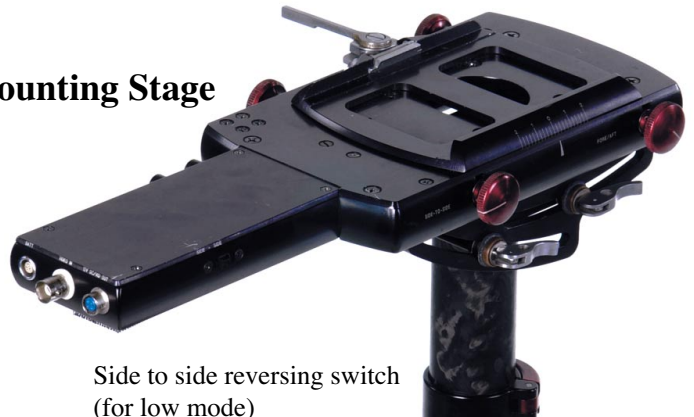
Ultra Electronics



Stage motor speed control knobs

Camera Mounting Stage

Dual 13.2 and 28.8 volt power jacks
HRS 12 volt power and video out jack



13.2 or 28.8 volt power jack for focus motors
BNC video in
HRS 12 volt power and video in jack

Side to side reversing switch
(for low mode)

Monitor controls



On
Standby
Off

Brightness & Contrast

Vertical gain (pull to engage)

Image flip and invert
(slide cover when off to reveal switches)

Electronics function selector

Electronics adjustment knob



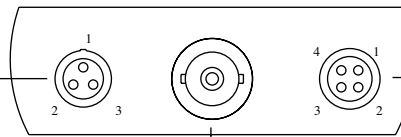
Circuit breaker

13.2 and 28.8 volt accessory jack

Connector Pinouts and Control Panel

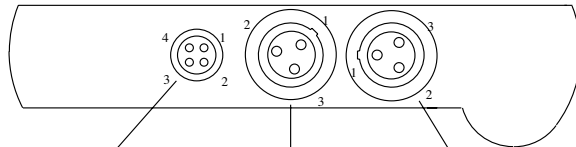
Stage Electronics: Front

Receiver Power Jack (J7): 3 Pin Lemo
 Pin 1: Ground
 Pin 2: + 13.2 VDC
 Pin 3: + Battery (28.8 VDC)



Video in Jack (J8): BNC

12 VDC / Video Out Jack (J9): 4 Pin Hirose
 Pin 1: Ground
 Pin 2: Video ground
 Pin 3: Video out
 Pin 4: + 12 VDC regulated, 1 amp max

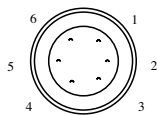


Stage Electronics: Rear

12 VDC / Video In Jack (J6): 4 Pin Hirose
 Pin 1: Ground
 Pin 2: Video ground
 Pin 3: Video in
 Pin 4: + 12 VDC regulated, 1 amp max

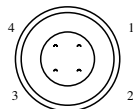
Camera Power Jacks (J4 and J5): 3 pin Lemo
 Pin 1: Ground
 Pin 2: + 13.2 VDC
 Pin 3: + Battery (28.8 VDC)

Monitor Mating Jack (J7): 6 Pin Hirose
 Pin 1: Ground
 Pin 2: Video ground
 Pin 3: Monitor video
 Pin 4: + 13.2 VDC
 Pin 5: + Battery (28.8 VDC)
 Pin 6: Ground

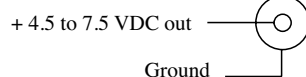


Main power switch (SW4)

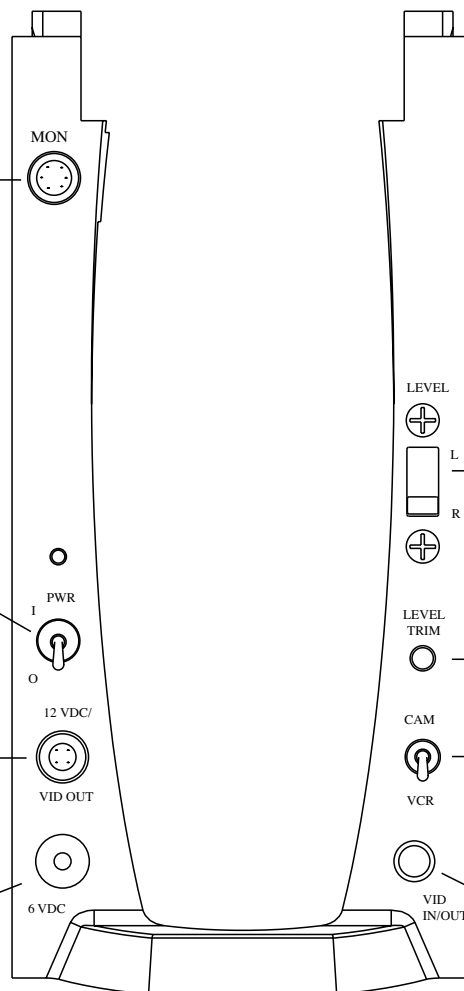
12 VDC / Video Out Jack (J6): 4 Pin Hirose
 Pin 1: Ground
 Pin 2: Video ground
 Pin 3: Video out
 Pin 4: + 13.2 VDC



+ 6 VDC Barrel Jack (J5)
 (2 amps max)



Ultra Front Panel



LEVEL



L



R



LEVEL TRIM



CAM



VCR



VID IN/OUT

Horizon Display Switch (SW2)
 Left/Right Inversion

Horizon Display Pot (PT1)
 Level Adjustment

Camera/VCR Mode Switch (SW3)

CAM: Either stage input
 displayed on monitor
 VCR: RCA jack input
 displayed on monitor

RCA Video In/Out Jack (J4)
 CAM: Video out
 VCR: Video in

The Ultra Vest

Emergency release handle

New style shoulder connector

Adjustable spar

Adjustable buckles

Chest straps

Titanium socket block

Socket block height adjustment

Emergency release line

Shoulder pads

Chest pads

Cross back straps

Hip pads

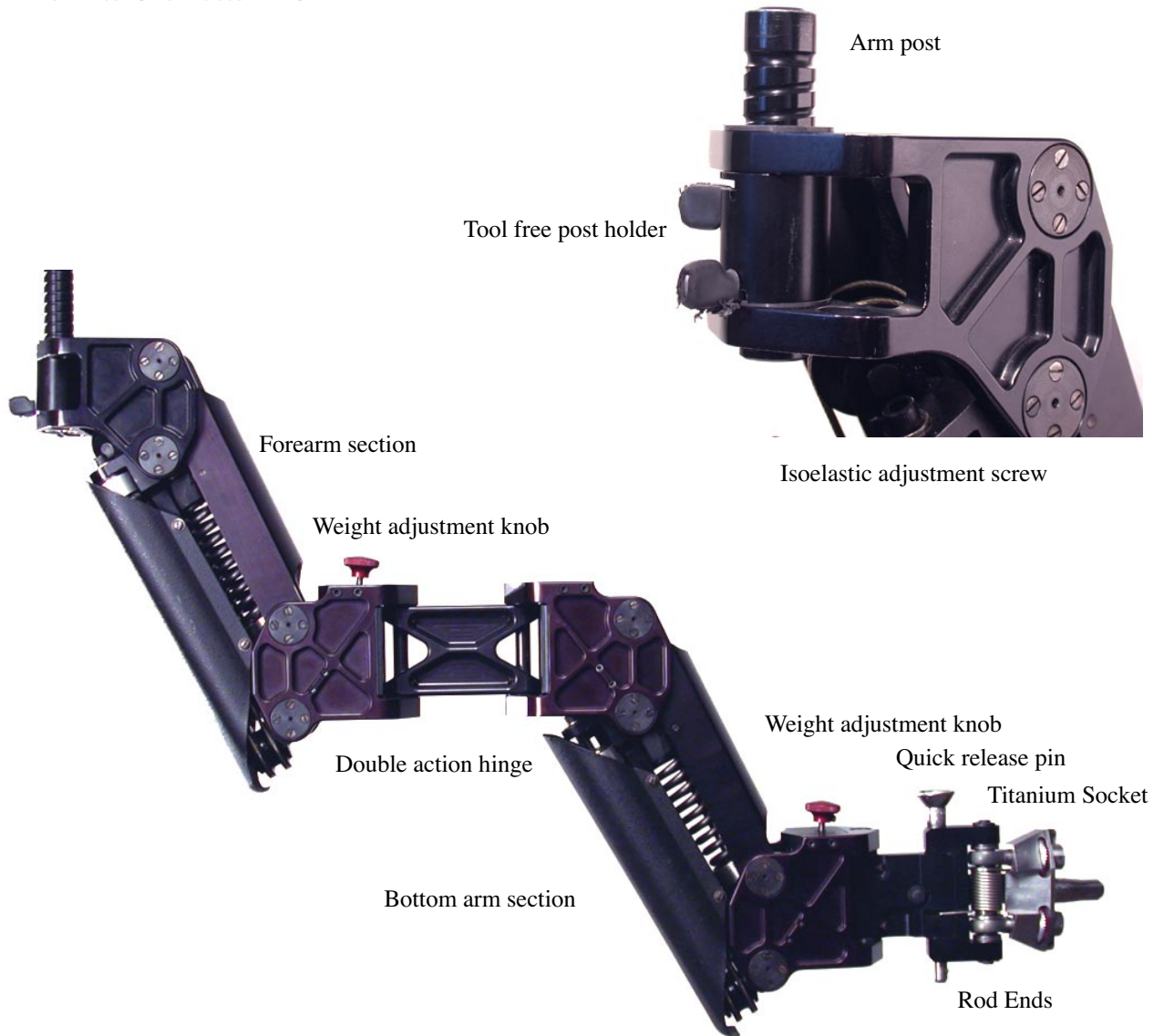
Lower back pads



The vest must be properly adjusted for the emergency release system to work.

Note that the emergency release line is tightened and that both back straps are disconnected.

The Isoelastic Arm



Supplied Accessories



Monitor hoods for the 5" CRT or the 8.4" LCD



Long and short camera mounting dovetails

Video and power cables
(not all shown)



Dynamic Balance Computer



Docking bracket

Spares Kit: (not shown!!)
Tape measure, 1/4-20 and 3/-16 camera screws, monitor fuse, Low Mode gimbal screw hex driver, vest ratchet handles, mounting hardware, battery for stage remote control.



Stabilizing system:
Carbon fiber spreaders and
Vectran™ line

Arm posts: 12", 5", and 3.5"



Slanted F-bracket



F-bracket
(old style)



Battery charger and
battery connector

28.8 VDC
Batteries (4)



Cases & packing



The vest and sled cases have wheels and a retractable handle.

A soft vest bag is provided, but it is not recommended for shipping.

Many other accessories are shipped in battery case.

Most operators have several other cases for their accessories, tools, low mode brackets, video recorders, video transmitters, diversity receivers, remote focus equipment, etc.

Tip:

When removing the sled from the case, be sure to support the monitor by grabbing the rods, as shown.

When repacking the sled into the case, be sure that the sled length and the monitor's angle and extension are properly set so that the sled drops freely into place.

Many operators cut the foam to accommodate accessories kept on the sled - such as a focus motor receiver or a small VCR. A long, thin razor blade works fairly well to cut the foam, as does a serrated knife.



Fitting the Vest

The vest is the major connection between your body and the Steadicam.

It must be adjusted properly and feel good on your body.

The vest is not intended to be a straightjacket. You should be able to move and breathe easily.

The socket block for the arm should move with you and not shift under load.

The overall length should be adjusted so that lifting your legs while taking a step up doesn't disturb the vest. The hip pads should comfortably grab your hips.

Start at the top.



Be sure the shoulder pads are firmly down on your shoulders.

The chest pads are snugged up next.

You should be able to breathe a little, but the vest should not be able to slip forward and down. Diaphragmatic breathing (like a baby) works best.

Push the vest down on your shoulders again, be sure the spar is vertical, then snug up the hip pads. If the hip pads are tightened first, the vest will tend to ride high until loaded, and then it will slip around under load.



Tip:

While wearing the vest and resting between takes, release the vest straps to increase blood flow and ease tension in your muscles.



Lastly, snug up the rear cross straps. This will prevent the vest from slipping as well as reduce side loading.



Note:

A few operators have body shapes or sizes that are out of the general range of adjustments.

You may find you have to add or remove padding, shorten or extend straps, etc. to make the vest fit perfectly.

Available options: a short vest, and longer chest, hip, and cross back straps.

Attaching the Camera

The basic idea: Position the camera's center of gravity about .75 inch behind the centerline of the post fore-aft (as seen from the side) and directly over the centerline of the post side-to-side (as seen from the front or rear).

First, center the side-to-side and fore-aft adjustments of the camera mounting platform, using the knobs or the remote controlled motors.

Attach all the accessories to the camera, including lenses, loaded film magazines, focus motors, obie lights, transmitters, etc. **Don't worry too much** if you must add your motors or other accessories after you have attached the dovetail plate.

Using a rod or pencil, find the c.g. of the camera, both fore-aft and side-to-side. Temporarily mark this with pieces of tape.

Attach the long dovetail plate to the bottom of the camera, centered as closely as possible under the camera's c.g. Use two screws to keep the camera from rotating.



If possible, attach a second dovetail (perhaps the short dovetail) to the top of the camera, directly above the first one. This may require additional hardware, such as a special low mode bracket for your camera.



Camera c.g. .75" behind center post – fore-aft.



Camera c.g. centered over post – side to side.



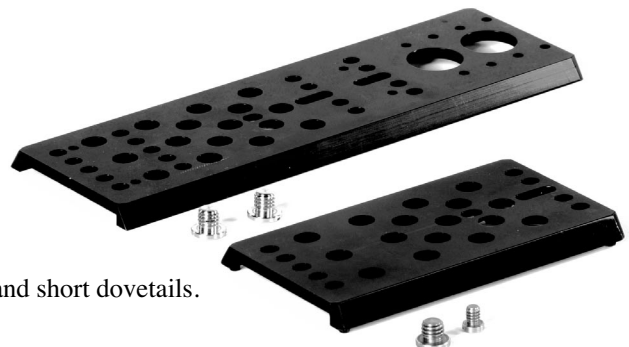
Finding the camera's fore-aft center of gravity.



Finding the camera's side to side center of gravity.

Tip:

If you add your focus motors at this point, remark the camera c.g. If the side-to-side position drastically changes, you may have to reposition the dovetail plate on the camera.

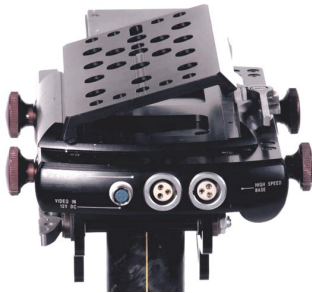


Long and short dovetails.

The dovetail locking lever has three positions:

All the way back is fully open and the dovetail can be inserted or released.

At the half way or 90 degree position, the dovetail can slide back and forth for gross positioning of the camera, but it cannot be released. All the way forward is the locked position.



How the dovetail drops into place.

Place the camera above the camera mounting platform. Be sure the locking lever is fully open.

Angle the left edge of the dovetail into the holder. Be sure to keep everything parallel. Lower the right side into the holder.

If the camera won't drop fully into place, be sure the left side of the dovetail is fully inserted, all is parallel, and the locking lever is fully open. It's a close fit.

After the dovetail drops into place, close the locking lever half way and slide the camera until the fore-aft c.g. mark is about .75 inches behind the centerline of the telescoping posts.

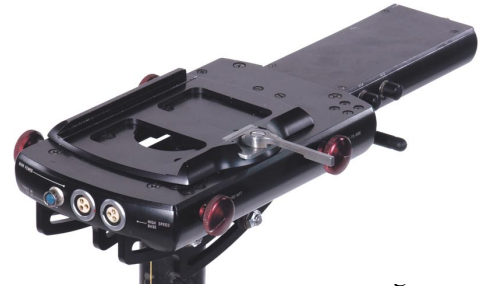
Post #2 is 1.580 in diameter, so you can use the back of the post as a guide for placing the camera c.g.

Push the locking lever forward to fully lock the camera into place.

You are now ready to static balance the sled.



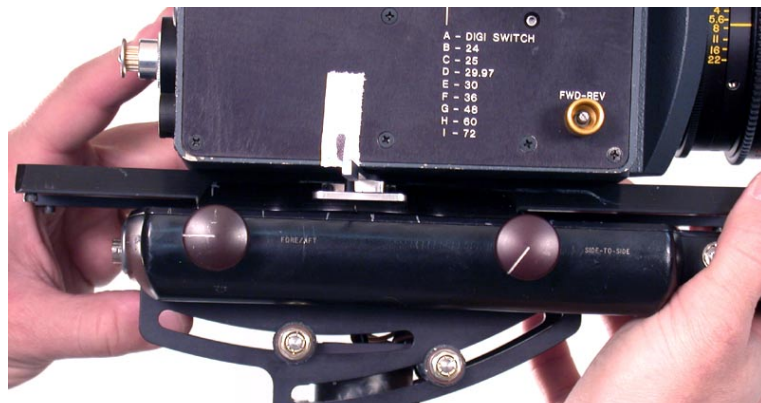
Dovetail locking lever fully open.



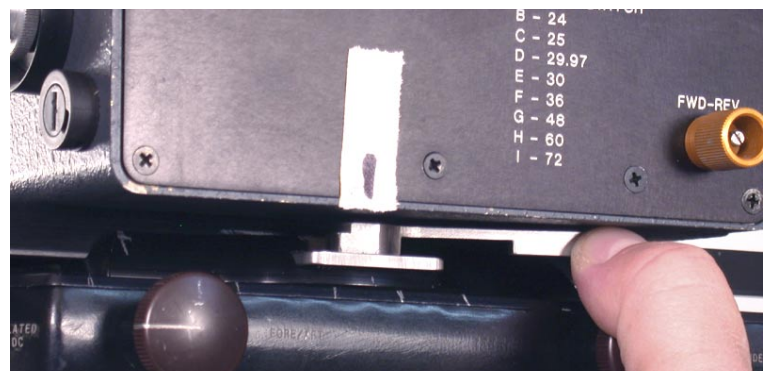
in this position, the dovetail can slide but cannot be removed.



Dovetail locked into place.



Sliding the camera with the locking lever at 90 degrees.



Closing the locking lever. Push firmly.

Static Balancing

The Steadicam sled should be carefully balanced to help the operator get the shot.

The Ultra is the first Steadicam with full and easy control over static, dynamic, and inertial balance.

Before balancing, the sled should have the camera and battery attached, all cables secured, and all accessories on board.

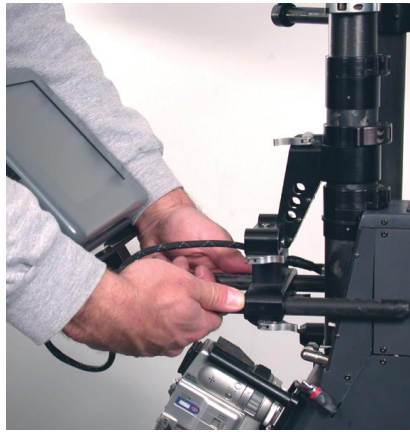


The gimbal should be near the top of post number two.



Do not release the gimbal clamp if it is supporting a vertical sled! The proper method is shown in the photo.

The posts and the monitor bracket should all be properly aligned. Check the index marks on the posts. Release the proper clamp and rotate any section that is out of alignment.



Release the monitor rod clamps closest to the centerpost and pull out the monitor so that the dual support rods clear the center post. Re-lock the clamp. The 8.4 inch LCD monitor and 12 inch rods are shown in the photo.



Release the two rod clamps at the base of the sled and pull out the battery three or four inches. Retighten the battery rod clamps.

If you know it's going to be an ultra high mode shot, low mode, or you need extra inertia, etc., extend the posts and position the monitor and the tilt head as best you can before you static balance the sled.

However, in all cases, place the camera c.g. about .75 inch behind the centerline of the telescoping posts.

Tip:

When adjusting the balance fore-aft or side-to-side, moving any weight "up hill" makes the sled hang more vertically.

Two Too Light Camera Tips:

With a fully compressed sled and a very light camera, the gimbal can get very low, causing the arm to hit the electronics module. You can raise the gimbal by raising post three (and the attached monitor) while leaving the sled length the same.



Tip one: Release the clamps at the top of posts three and four and slide post three up to the gimbal.

Lock post three in place, and then lock post four to maintain the minimal sled length. Rebalance top-to-bottom.



An alternative solution (tip two): Raise the c.g. of the sled – and therefore the gimbal – by raising post number one (see photo above). This makes the whole sled a little longer and raises the lens height slightly. Either way, the gimbal moves away from the electronics module.

For normal operating:

Mount the gimbal on the balancing stud. It's a good idea at this point to have an assistant hold the C-stand.

You need to balance the sled in all three axes: fore-aft, side to side, and top to bottom.

Pick the most out of balance axis and get that close to being in balance, then work on another axis. You may have to go back to tweak the balance in any given axis several times.

To adjust top-to-bottom balance, tilt the sled until it is horizontal.

Hold the sled firmly and release the gimbal clamp. Slide the gimbal until the sled hangs horizontally - **but never allow the sled to move from horizontal with the gimbal clamp open.**

Slide the gimbal up towards the camera about .5 inch and lock the gimbal.

Let the sled rotate (drop) through vertical and note the time. A two second drop time is a good starting point. Raise or lower the gimbal slightly to get a faster or slower drop time.

Keep the camera c.g. about .75 inches behind the centerpost and **move the battery in or out to get close to fore-aft balance.** Fine tune fore-aft balance with the knobs on the stage.

To adjust the side-to-side balance, use the knobs on the camera mounting stage.



A Really Fast Balancing Tip:

To speed up the process of side-to-side and fore-aft balancing, **hold the sled vertical with your operating hand on the gimbal.** Hold the gimbal the same way you would do while operating (see the photo above).

Hold the sled absolutely vertical as you adjust the side-to-side or fore/aft balance.

Turn the adjustment knobs with your other hand (or use the stage motor transmitter) until you feel no pressure on your operating hand, and the sled will be in static balance.



When the sled is very bottom heavy, it has a short drop time and it will require bigger movements of a weight to properly balance the sled.

When the sled is nearly neutrally balanced top to bottom, very slight movements of the camera or battery will have a large effect on balance.

The sled will behave differently depending on how bottom heavy it is.

A different drop time is required for long mode shooting. See pages 42-43 for details.