

# Systems Manual

STRATTON **CAMERA**  
Farmington Hills, Michigan

Weaver/Steadman

2-Axis Head

3-Axis Head

Dutch Angle Head

Multi-Axis Jib Arm

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# 2-Axis Head

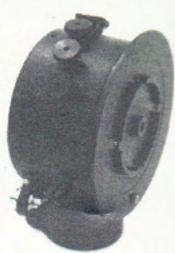


## Weaver/Steadman 2-Axis Head

The fluid W/S 2-Axis Head utilizes modular design and tube frame construction to provide a lightweight, rigid, infinitely adjustable Assembly that supports and balances a Camera Package. Mounted in an upright or suspended (underslung) position, this quickly assembled System excels in situations that require extreme tilts, extreme low angles, or near nodal point configurations.

## W/S 2-Axis Head Parts List

Pan Module



Tilt Module



90° Bracket



Dutch Angle Bracket



Drop Bracket with Lead Screw Assembly and Locking Lever



Allen Wrench



Pan Handle



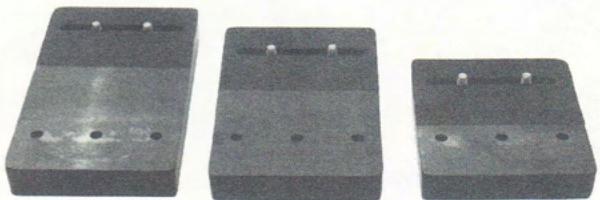
Safety Collar with Fast Pin



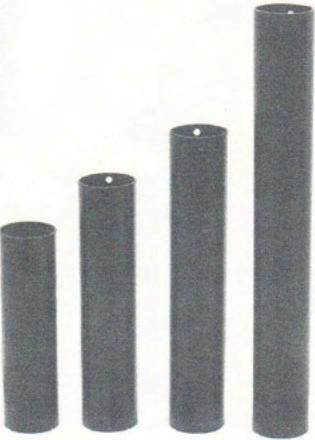
Tie-Down Assembly



Panavision /Arri /Video Shoes



9" Tube, 11" Tube, 13" Tube, 18" Tube

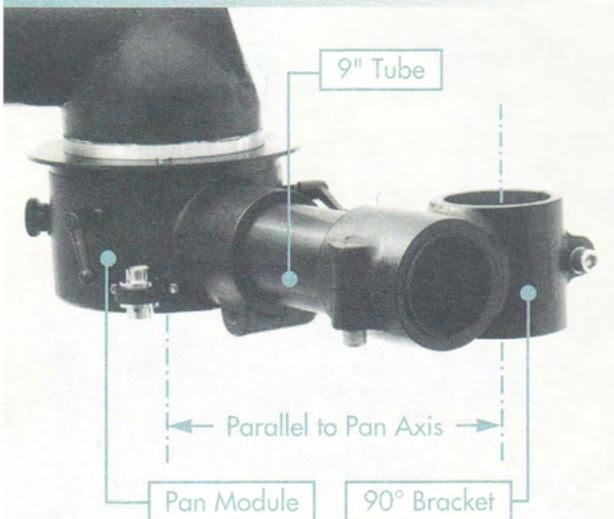


## W/S 2-Axis Head assembly

**1** Mount the Pan Module on a dolly, tripod or jib arm. Make sure the Module is securely attached, with 1/2"-5/8" (10 turns) of the Tie-Down Assembly Knob's screw threaded into the Mitchell Plate. (See page 11, #1 if the Knob's screw is too short.)

**2** Install a 9" Tube in the Pan Module's socket. Using the shortest Tube possible makes a more compact Assembly. Make sure the Tube is fully inserted; securely tighten the Allen Screw.

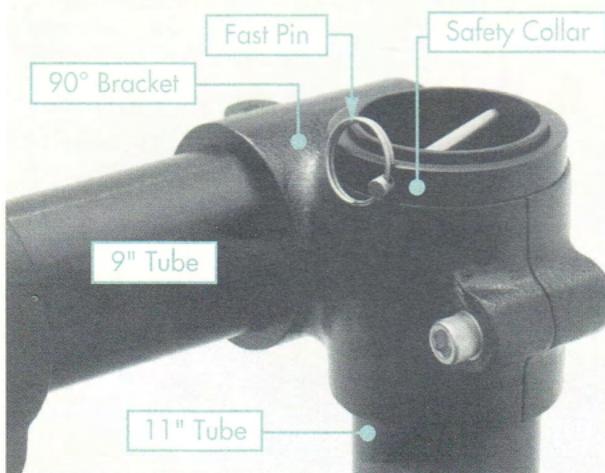
**3** Install the 90° Bracket on the end of the 9" Tube. Vertically align the Bracket's empty socket, so it is parallel with the pan axis; securely tighten the Allen Screw.



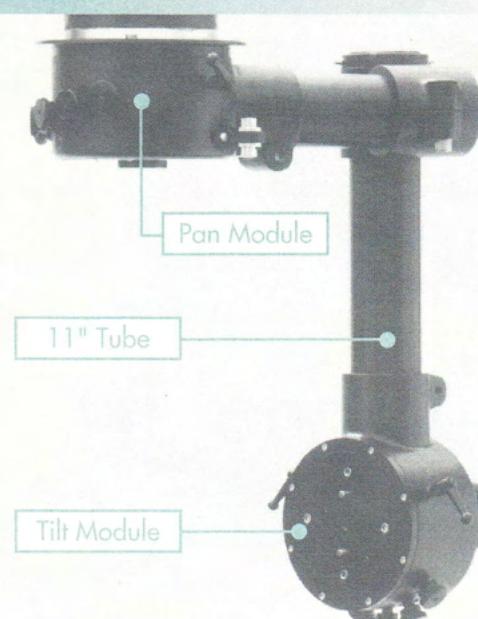
**4** Install the Safety Collar on the 11" Tube when the Head is in a suspended position to prevent the Camera from falling while adjusting the 90° Bracket. Mount the Collar on the end of the Tube with 1/4" holes; align the holes and insert the Fast Pin all the way through the Assembly.

**5** Install the 11" Tube in the 90° Bracket's vertical socket. When mounting the Head in an upright position, insert the Tube from below until the Safety Collar meets the Bracket; in a suspended position, drop the Tube through the 90° Bracket from above. Securely tighten the remaining Allen Screw.

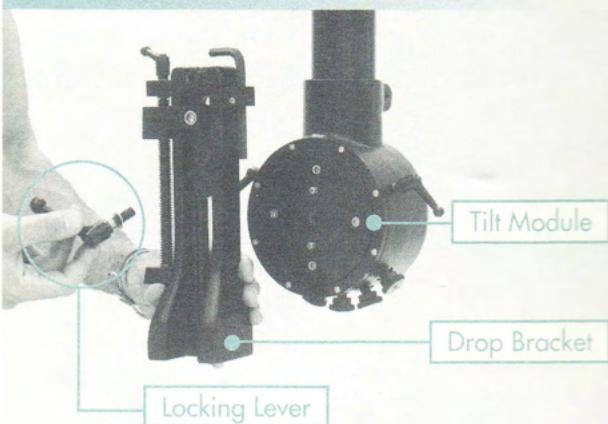
The 11" Tube is most often used because it creates a compact configuration. Special situations may require a longer Tube for lens or magazine clearance.



**6** Install the Tilt Module on the vertical Tube with its face toward the Pan Module side of the Assembly. Make sure the Tube is fully inserted into the Tilt Module's socket; securely tighten the Socket Screw.



**7** Install the Drop Bracket on the Tilt Module, engaging the T-nut on the 2 pins and screwing in the Locking Lever. Be sure to use the washer provided.



**8** Mount the Camera Shoe on the Drop Bracket. There are 3 Shoes provided which will accommodate most Cameras. Use the shortest Shoe that will allow the Camera to clear the Drop Bracket/Locking Lever; this keeps the Assembly compact and facilitates aligning the Camera over (or under) the pan axis.

Each Shoe has 3 mounting holes and 1 or 2 slots for attaching the Camera. 2 of 3 holes are used to mount the Shoe on the bottom of the Drop Bracket, depending on individual requirements. For example, the front 2 holes might be used with a Panaflex and primes to keep the Shoe more centered under the Camera; the rear 2 holes might be used for attaching a B.L. with a zoom.

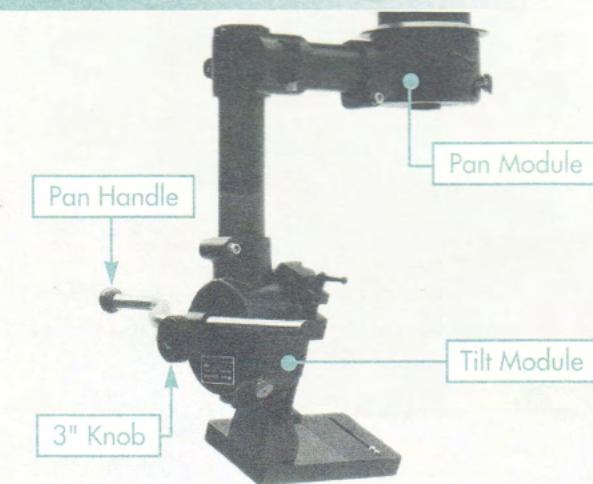
The slots are **only** used for attaching the Camera. (See page 11, #2 for details on removing a Mounting Screw from the Camera Shoe.)



**9** Mount the Camera's Dovetail Base if required. Otherwise, mount the Camera directly on the Shoe using the (2) Camera Mounting Screws captive in the slot.

**10** Mount the Camera, sliding it forward until approximately centered on its dovetail base.

**11** Install the Pan Handle on the Tilt Module. Be sure to tighten the 3" Knob on the Handle Clamp to fully engage the serrated teeth between the Clamp and tilt axle.



### Note

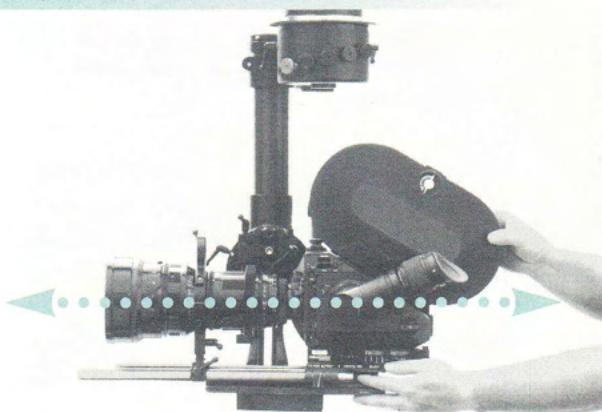
1. If the Mitchell mount on the dolly or tripod is too thick, the Tie-Down Assembly Knob may not thread far enough into the Mitchell Plate on the Pan Module's base to support the Head. To adjust, loosen the Allen Screw on the side of the Knob and increase the length of the Knob's screw until 1/2"-5/8" will thread into the Head's Mitchell Plate. Re-tighten the Allen Screw onto the flat surface of the Knob's screw.

2. Removing a Mounting Screw from the Camera Shoe can seem tricky because it is captive in the slot. To remove, slide the Bolt towards the end of the slot where threads are cut (look closely for the threads on the step within the slot). The Mounting Screw can only be unscrewed here; **do not** attempt to force it out of the slot.

## Camera balance adjustments

Horizontal and vertical balancing involve positioning the Camera's center of gravity so it lines up with the axis of the Tilt Module's axle. When in balance, the Camera will remain wherever it is positioned with the Knurled Spring Plunger Knobs fully disengaged and the Brakes backed off.

- 1** Mount all Camera accessories before making adjustments. Generally, a lighter Camera and Package (magazines, lenses, matte boxes) make a more compact Assembly that is easier to operate. If possible, avoid extended eyepieces which are heavy and tend to change the Camera's balance.
- 2** With Brakes on, unscrew all Knurled Spring Plunger Knobs. Then, while supporting the Camera, release the Brakes. Any minor imbalance will be apparent.
- 3** Adjust the Camera's horizontal balance. Slide the Camera Package on its dovetail base until the Camera remains in balance with the Tilt Module's Brakes released; lock the Camera to the dovetail base and/or Camera Shoe.

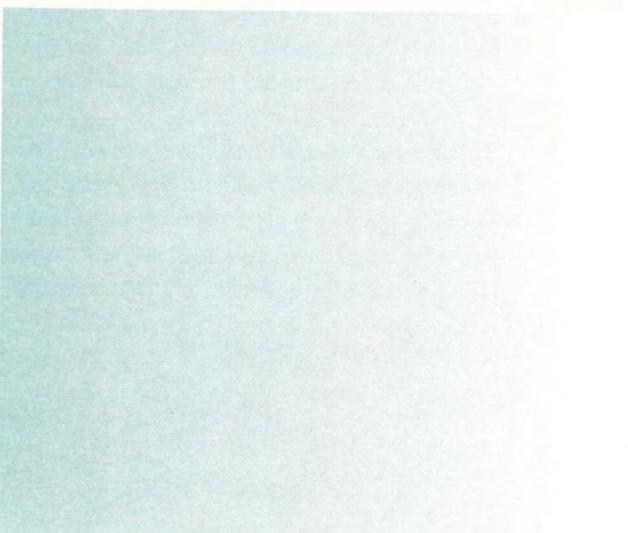


12 Weaver/Steadman 2-Axis Head

### 4a

**Adjust the Camera's vertical balance.** This capability is a unique feature of the W/S Head. Begin by adjusting for clearance. Tilt the Camera 90°, so the lens is aimed straight down. When the Assembly is in an upright position, the matte box rods may hit the Pan Module. Use a longer vertical Tube for clearance, or loosen the Allen Screw on the socket at the base of the Tilt Module and swing the Camera clockwise (forward) to clear the Pan Module.

When the Assembly is suspended, the magazine may hit the Pan Module. Make sure the Safety Collar is installed, then loosen the 90° Bracket so the Camera can swing in either direction to avoid contact with the Module.

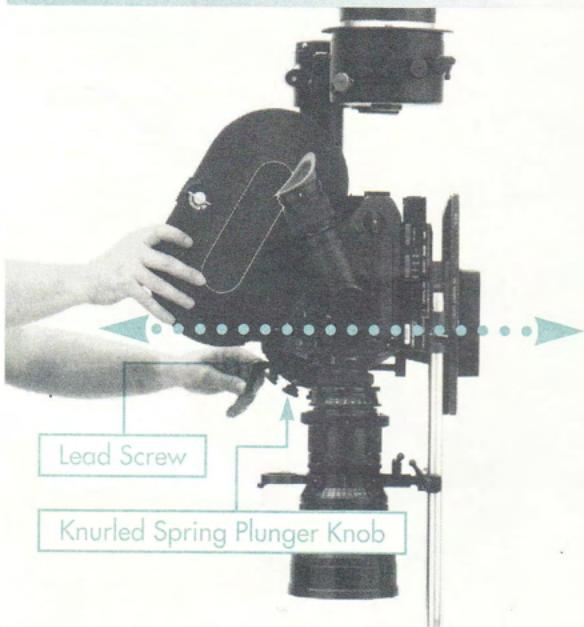


13 Weaver/Steadman 2-Axis Head

## Drag Knob adjustments

4b

Now, make the vertical adjustment. While supporting the weight of the Camera with one hand, loosen the Drop Bracket's Locking Lever 1/2-turn and crank the Lead Screw which will move the Bracket horizontally (relative to the Tilt Module). When the Camera is in balance, lock off the Bracket's Locking Lever and tilt the Assembly back to a level position. Now, the Camera/Tilt Module can be swung back over (or under) the Pan Module.



### Note

1. The Pan Module does not have to be directly under or over the Camera. Instead, the offset arrangement is variable — creating options for unusual problem solving.
2. Tubes which configure the Head can be switched or adjusted without disturbing the Camera's balance, as long as the Camera Package and Tilt Module remain unchanged. Using shorter Tubes makes a more compact Assembly.

Knurled Spring Plunger Knobs on both the Pan and Tilt Modules control drag; each Knob controls an individual disc of fixed resistance. As the Knob is screwed into the main Module, a spring-loaded pin is lowered onto the edge of a disc. The Module is rotated and, with a click, the pin becomes seated in a slot on the disc.

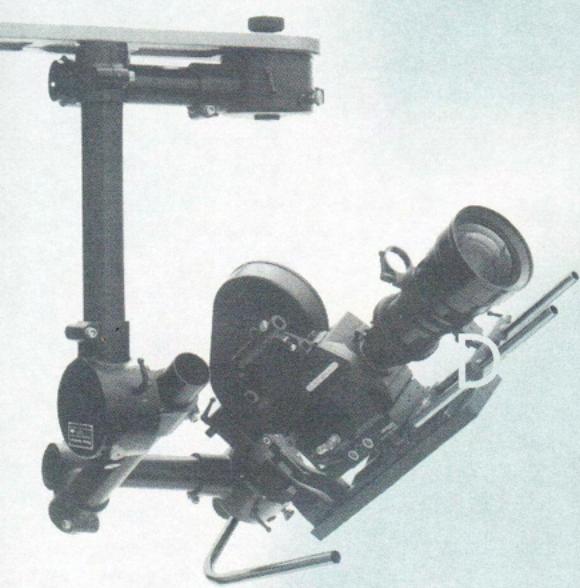
To engage a Knurled Spring Plunger Knob, make sure it is screwed in clockwise all the way, snug but not over-tightened. Screwing a Knob down harder will **not result** in more drag. To disengage a Knob, make sure it is backed out counterclockwise all the way (not tightly) to clear the disc's edge. Partially engaged or disengaged Knobs will **not affect** dampening, but will diminish smoothness and impair continuity of movement.

The blue Knob engages the disc with the lightest drag — usually sufficient for most situations. Very little drag is required to smoothly control the Camera when balance is properly adjusted. In fact, less drag is more desirable for making agile starts and stops.

### Note

A partially engaged Knurled Spring Plunger Knob may make a clicking sound when the Head is rotated, indicating the Knob needs to be completely screwed in or backed out.

# 3-Axis Head

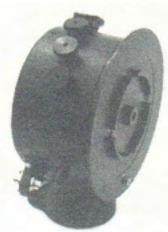


## Weaver/Steadman 3-Axis Head

The W/S 3-Axis Head combines the 2-Axis Head with the Third-Axis Module. In this configuration, the Third-Axis Module controls **tilt** and the original Tilt Module facilitates Camera **roll**, enabling cinematographers to pan, tilt and roll the Camera close to the lens axis. The Camera Package can be rolled while suspended from a Jib Arm, making any move imaginable — from skimming along the ground on a ubangi/dolly to flying and rolling more than 360° (using a video assist monitor to view the shot).

## W/S 3-Axis Head parts list

Pan Module



Tilt Module



Third-Axis Module



90° Bracket (2)



Dutch Angle Bracket



Drop Bracket with Lead Screw Assembly and Locking Lever



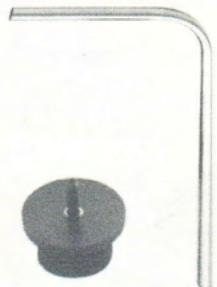
Allen Wrench



Pan Handle



Third-Axis Handle



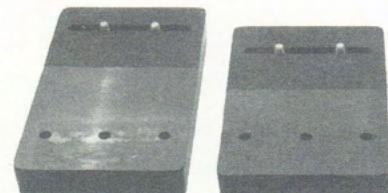
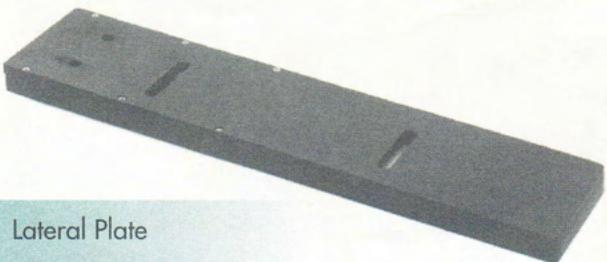
Tie-Down Assembly



Safety Collar with Fast Pin (2)

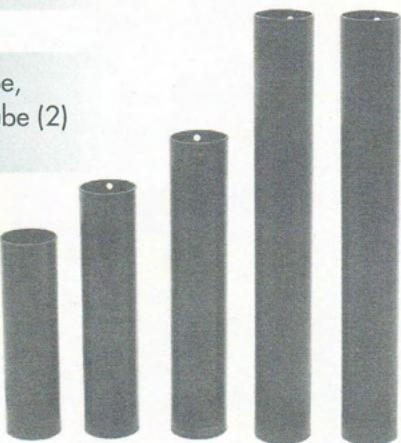


Lateral Plate



Panavision / Arri / Video Shoes

9" Tube, 11" Tube, 13" Tube, 18" Tube (2)



## W/S 3-Axis Head assembly

The following directions are for a suspended position — a unique feature of the W/S 3-Axis Head; it can also be assembled in an upright position.

**1** **Install the Pan Module on the support equipment;** make sure it is securely attached to the Mitchell mount.

**2** **Install a 13" Tube in the Pan Module's socket.** Make sure the Tube is fully inserted; securely tighten the socket's Allen Screw.

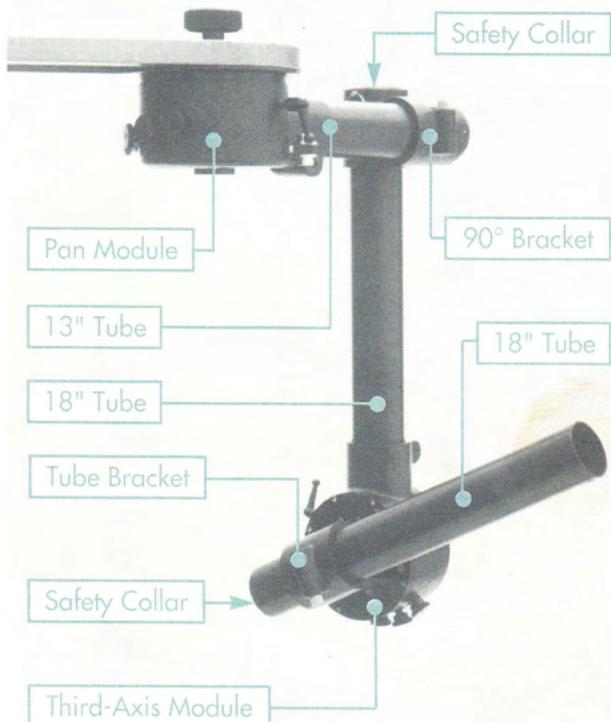
**3** **Install the 90° Bracket on the 13" Tube.** Vertically align the Bracket's socket, so it is parallel to the pan axis; securely tighten the appropriate Allen Screw.

**4** **Install a Safety Collar on both 18" Tubes.** Mount Collars on the ends of the Tubes with 1/4" holes; align the holes and insert the Fast Pin all the way through the Assembly.

**5** **Install one of the 18" Tubes through the 90° Bracket,** so its Safety Collar holes rest next to the Bracket.

**6** **Install the Third-Axis Module (now controlling tilt) on the 18" Tube.** This Module has a Tube Bracket attached to its rotating face. When installed, the face should point back toward the Assembly, under the Pan Module. Make sure the Tube is fully inserted into the Third-Axis Module's socket; securely tighten the Allen Screw.

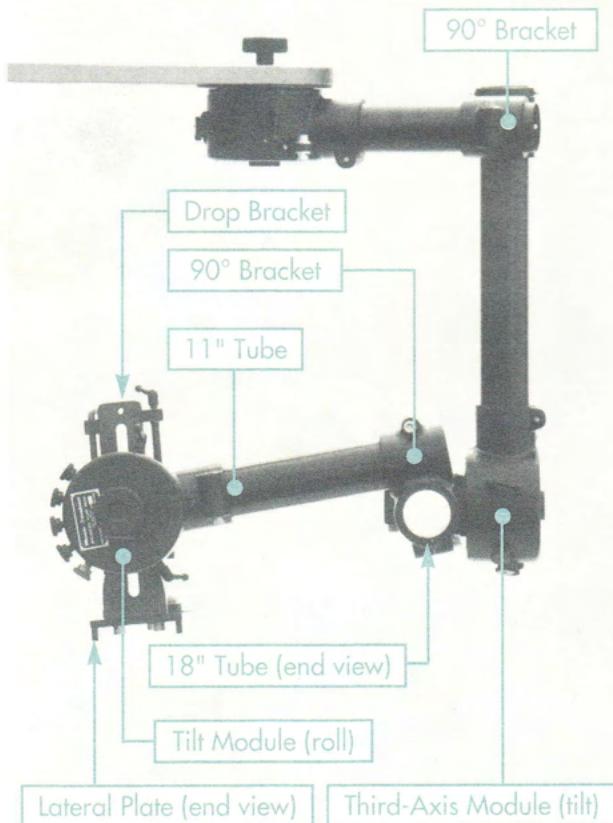
**7** **Install the second 18" Tube through the Third-Axis Module's Tube Bracket,** so its Safety Collar rests near the Bracket. The Tube should be horizontally aligned, with most of it extending out toward the back of the Assembly (away from the area under the Pan Module); securely tighten the Allen Screw.



**8** Install a second 90° Bracket on this 18" Tube, so the Bracket's empty socket is above the Tube, horizontally aligned; securely tighten the Allen Screw.

**9** Install an 11" Tube in the 90° Bracket. This cross-Tube should be horizontal and extend to the right when viewed from under the Pan Module; securely tighten the Allen Screw.

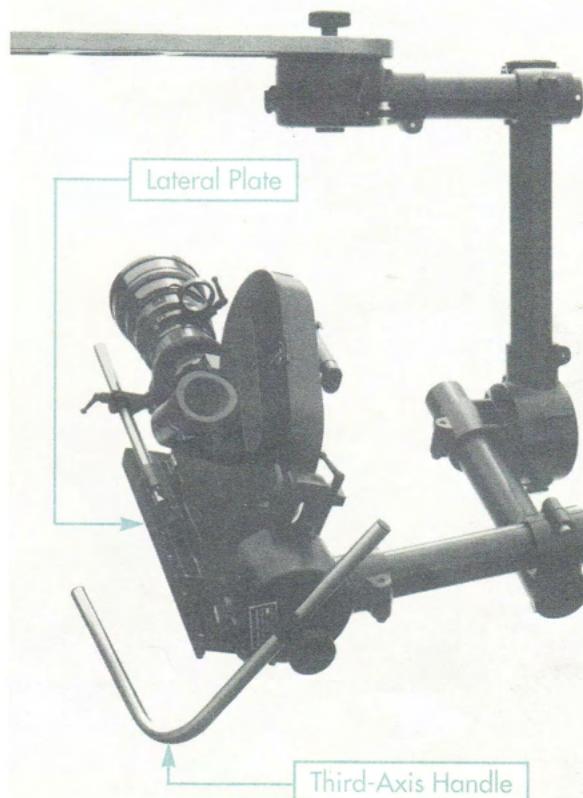
**10** Install the Tilt Module on the 11" Tube. Make sure the Module is fully inserted on the Tube; securely tighten the Allen Screw.



**11** Install the Drop Bracket on the Tilt Module with its T-nut, washer and Locking Lever. This Module will now be behind the Camera providing the roll axis.

**12** Install the Lateral Plate on the Drop Bracket; securely tighten the (2) Allen Screws, using the washers provided.

**13** Mount the Camera on the Lateral Plate, so the lens points away from the Module with the Drop Bracket. Make sure all of the (6) Brakes are on securely until balance adjustments are made.



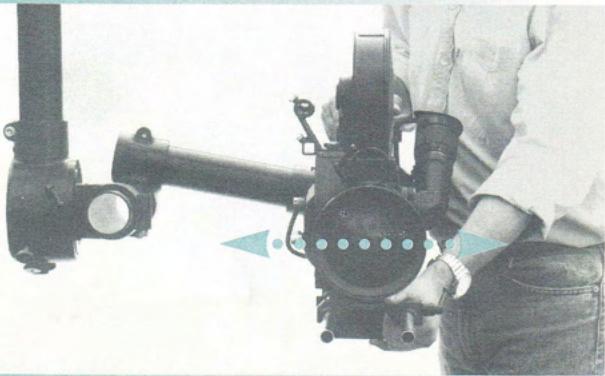
### Note

To mount an Arri with an Arri dovetail on the Lateral Plate, remove the small Allen Screw in the front of the dovetail and slide the Camera on from the front (wrong) end; replace the Allen Screw.

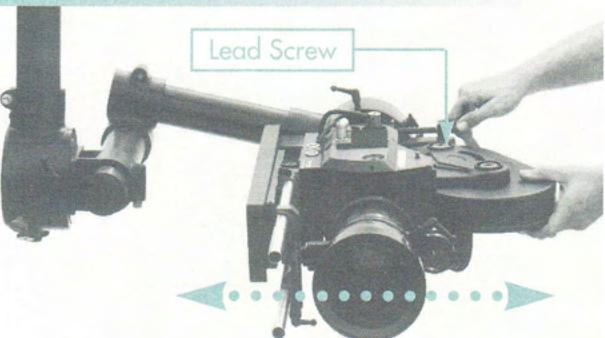
## Balancing the W/S 3-Axis Head

There are (4) steps for balancing the 3-Axis Head.

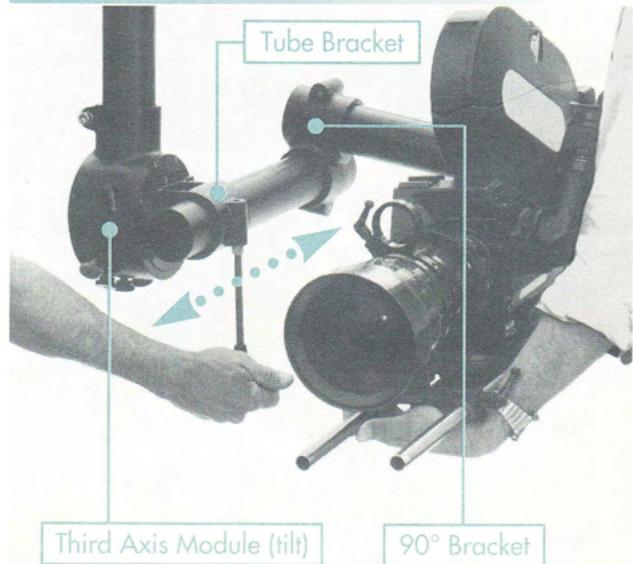
- 1** **Adjust the Third-Axis Module's lateral balance.** Release the (2) Brakes on the Module located directly behind the Camera, and slide the Camera from side to side until its balance point on the Lateral Plate is found. When in balance, the Camera will stay where positioned with the Brakes off; securely tighten the (2) Mounting Screws that attach the Camera.



- 2** **Adjust the Third-Axis Module's vertical balance.** Roll the Camera over on its side; if it rolls to the right or left with the Brakes released, additional balancing is required. While the Camera is on its side, support its weight with one hand and loosen the Drop Bracket's Locking Lever 1/2-turn. Adjust the Lead Screw until the Camera remains in balance when released. Securely tighten the Locking Lever; roll the Camera back to the upright position.

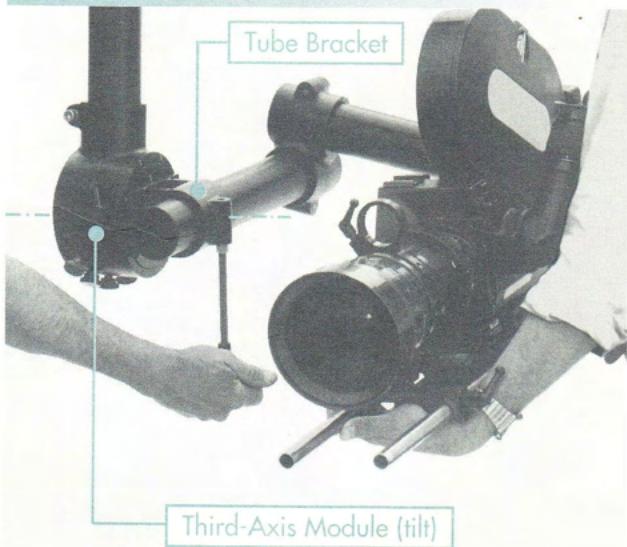


- 3** **Adjust the Tilt Module's lateral balance.** An assistant must support the Camera while the Tube Bracket on the face of the Third-Axis Module controlling tilt is loosened. Slide the 18" Tube horizontally through the Bracket until the Camera is in balance; securely tighten the Tube Bracket's Allen Screw. An additional adjustment may be made by sliding the 90° Bracket located behind the Camera on the horizontal 18" Tube, then tightening the Allen Screw. Again, an assistant must support the Camera. With some Camera Packages, fine-tuning this balance may be possible by adjusting the Camera's own dovetail base.



#### 4 Adjust the Tilt Module's vertical balance.

While an assistant supports the Camera, loosen the Tube Bracket on the Third-Axis Module. Raise or lower the Camera Package, rotating the 18" Tube within the Bracket to align the Camera Package's center of gravity with the axis of the Third-Axis Module's axle. Make sure the Tube does not move laterally as it rotates, so Step 3's adjustment is maintained. When in balance, securely tighten the Tube Bracket's Allen Screw.



#### Note

1. The center of the Camera Package's weight should be aligned with the axis of the Third-Axis Module's axle; some trial and error may be necessary. Once adjusted, the Tube's length relative to the Tube Bracket may be noted for future setups.

2. The Assembly pictured in this manual is comprised of an ARRI 35-III with a 400' magazine and a zoom lens. Other Camera Package's may require different Tube lengths.

3. Remember, the Assembly will be more rigid and responsive when the Camera Package's weight is kept as light as possible.

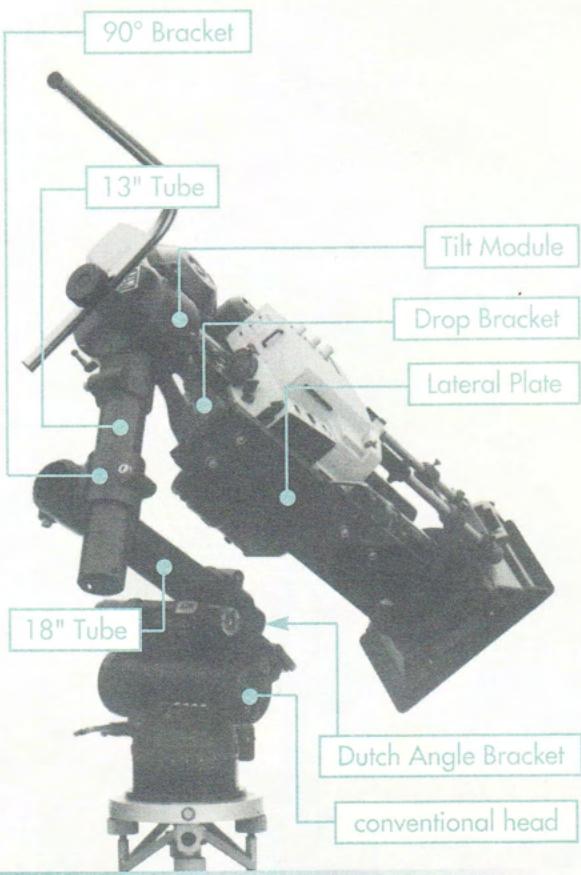
# Dutch Angle Head



## Weaver/Steadman Dutch Angle Head

This is a simple, fast Assembly for dutch angle shots in an upright position only. In this configuration, a conventional head (Sachtler 80, O'Connor or gear head) is mounted on a dolly or heavy-duty tripod to provide pan and tilt; the W/S Tilt Module is added to provide roll. The roll axis is easily lined up close to the Camera lens, eliminating framing problems generated when the Camera moves in an arc from side to side. Now, all dutch angles are possible.

## Weaver/Steadman Dutch Angle with conventional head assembly



- 1** Mount a conventional head on a dolly or tripod.
- 2** Mount the Dutch Angle Bracket on the conventional head and align the Tube socket with the direction of the lens.
- 3** Install an 18" Tube in the Dutch Angle Bracket so the Tube extends out the back, away from the lens; securely tighten the Allen Screw.
- 4** Install the 90° Bracket on the end of the 18" Tube. Vertically align the empty socket; securely tighten the Allen Screw.

**5** Install an 11" or 13" Tube vertically in the 90° Bracket; securely tighten the Allen Screw. Use the 13" Tube for magazine clearance when rolling the Camera Package 360°.

**6** Install the Tilt Module with the Drop Bracket facing the direction of the lens; tighten the Allen Screw. Adjust the 90° Bracket where it attaches to the bottom 18" Tube, so the Camera can be moved to a position directly above the pan axis.

**7** Install the Lateral Plate on the Drop Bracket; securely tighten the (2) Allen Screws, using the washers provided.

Front view of  
Dutch Angle assembly



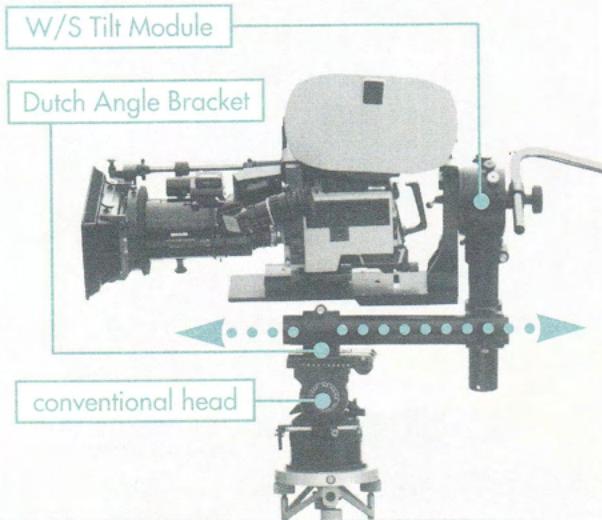
- 8** Mount the Camera on the Lateral Plate. The Camera Package should be positioned as close as possible to the Drop Bracket.

### Note

To mount an Arri with an Arri dovetail on the Lateral Plate, remove the small Allen Screw in the front of the dovetail and slide the Camera on from the front (wrong) end; replace the Allen Screw.

## Camera balance adjustments

There are (3) steps required to balance the Camera.



### 1 Adjust the conventional head's tilt balance.

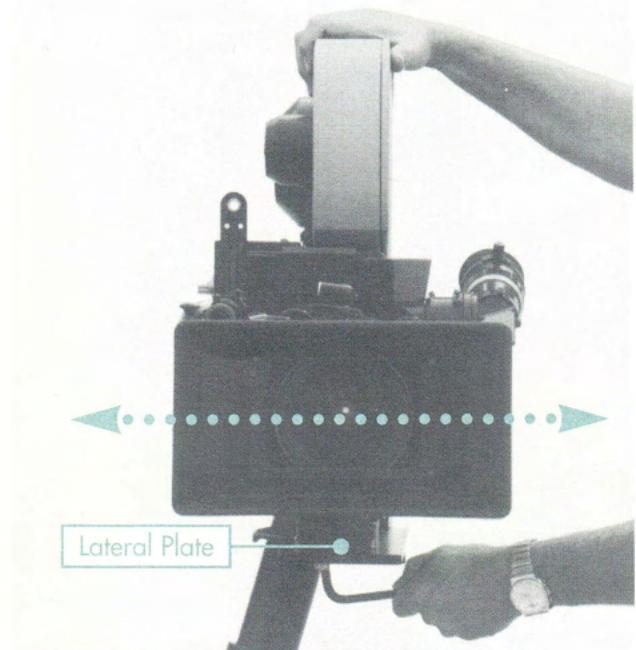
An assistant **must** support the Camera Package as the Dutch Angle Bracket's Tube socket is loosened. Then, slide the 18" Tube to adjust the whole Camera/Roll Assembly so the Camera is positioned slightly forward of the pan axis; securely tighten the Tube socket.

Next, release all drag and spring tension on the conventional head so any balance adjustment required will be more apparent.

Finally, loosen the conventional head's tilt brake and adjust for optimum balance (Sachtler and O'Connor have lead screw adjusters for fine-tuning balance); re-tighten the tilt brake.

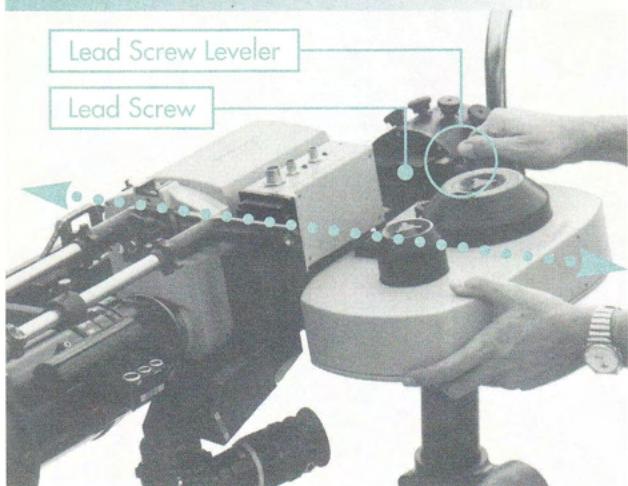
### 2 Adjust the W/S Module's lateral balance.

Unscrew all the Module's Knurled Spring Plunger Knobs and release the Brakes. Then, loosen the Camera's Mounting Screws under the Lateral Plate and slide the Camera from side to side until it is in balance; securely tighten the Mounting Screws.



### 3 Adjust the W/S Module's vertical balance.

With Brakes off, roll the Camera over on its side. If the Camera rolls to the right or left, loosen the Drop Bracket's Locking Lever 1/2-turn and adjust the Lead Screw until the Camera remains in balance when released; securely tighten the Locking Lever.



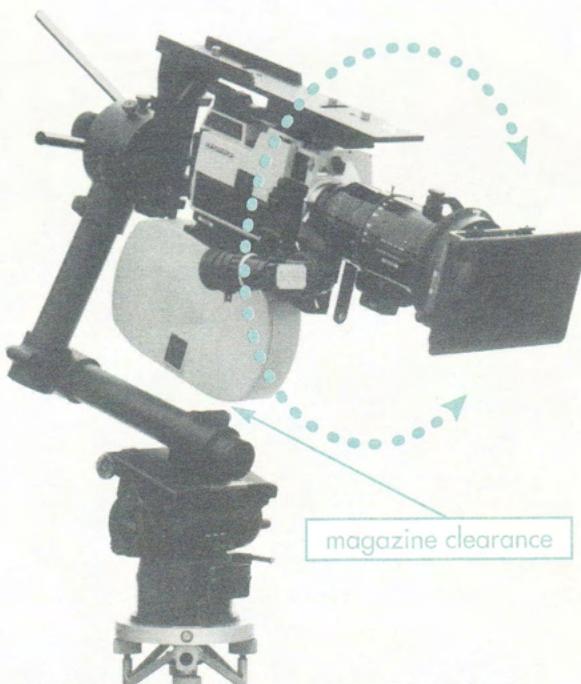
## Fine-tuning balance adjustments

1

**Fine-tune lateral balance** after rolling the Camera back to the upright position. Now, the Camera will come to rest at any angle with drag disengaged.

2

**Adjust the vertical Tube for minimum clearance** between the Lateral Plate and Dutch Angle Bracket to keep the Camera Package as low as possible. The Camera Package is high, so some spring tension must be used on the conventional head. For 360° rolls, adjust the vertical Tube with the Camera rolled upside down so the magazine clears the Dutch Angle Bracket.



3

**Adjust the conventional head's counter-balancing springs**, so the Camera will balance in any position between horizontal and an extreme tilt. Be sure to make this adjustment with all drag disengaged.

4

**Adjust drag.** Adjust drag on the conventional head for the desired response. Then, adjust drag on the W/S Module until it approximates that of the conventional head.

### Note

1. Lateral balancing may shift the Camera lens slightly off the exact axis of roll because the Camera body is not in balance with its lens axis. This offset will not affect most shots.

2. The lightest possible Camera Package is recommended for easy setup and smooth operation.

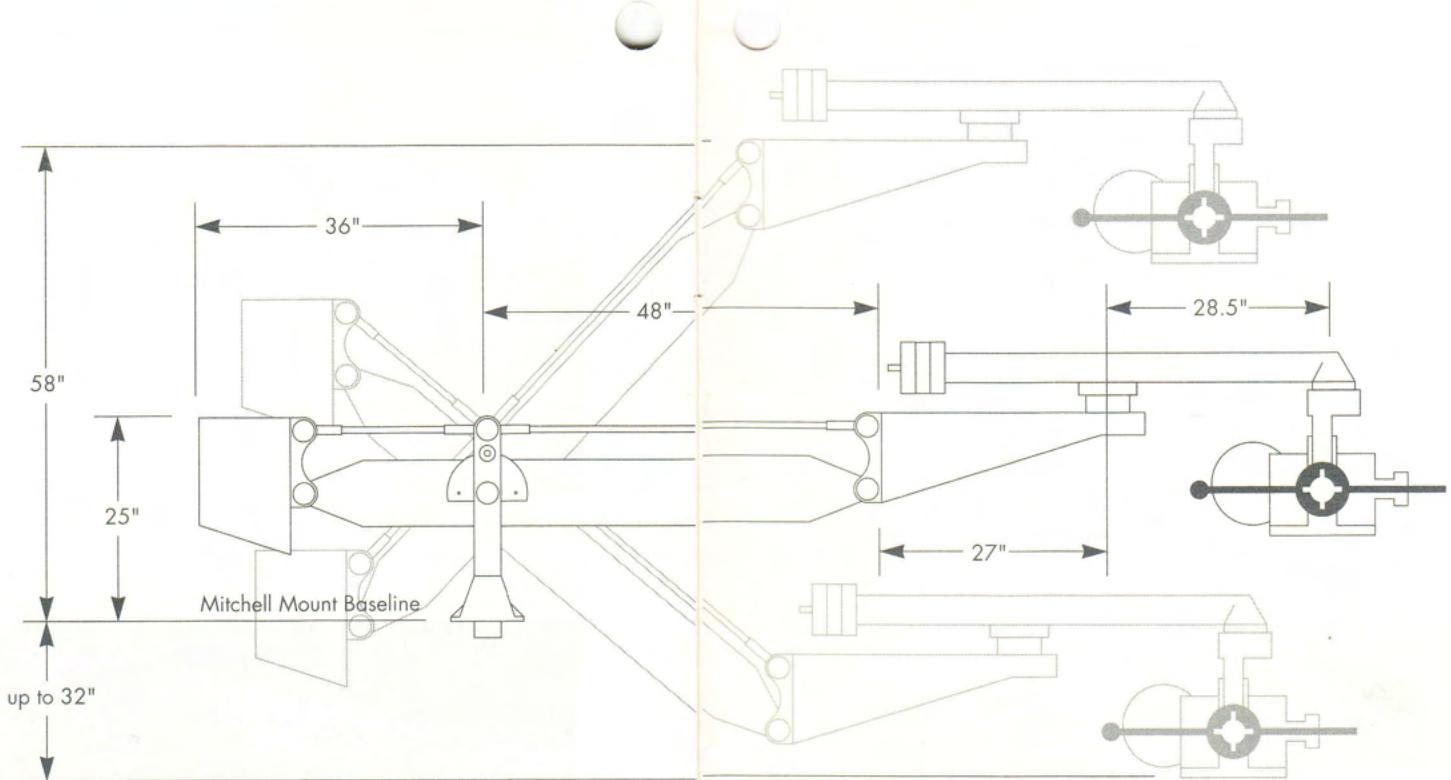
# Multi-Axis Jib Arm



## Weaver/Steadman Multi-Axis Jib Arm

The modular W/S Multi-Axis Jib Arm support system has adjustable fluid tension at all 5 axes (6 with the W/S 3-Axis Head). Carbon fiber construction and ultra precision robotics bearings combine for smooth, free-floating Camera control. The Multi-Axis Jib Arm can also be assembled without its Secondary Arm for a standard Jib Arm configuration.

## W/S Multi-Axis Jib Arm specifications



Maximum reach from center of dolly column to camera is nine feet plus

Maximum vertical range is 5'- 6"

Maximum horizontal range is 18'- 0"

Minimum distance between camera body and horizontal surface is 1.25"

Minimum aperture dimensions through which an ARRI 35 BL-3 with support will pass is 22"H x 14"W

Jib Arm weight is 154 lbs

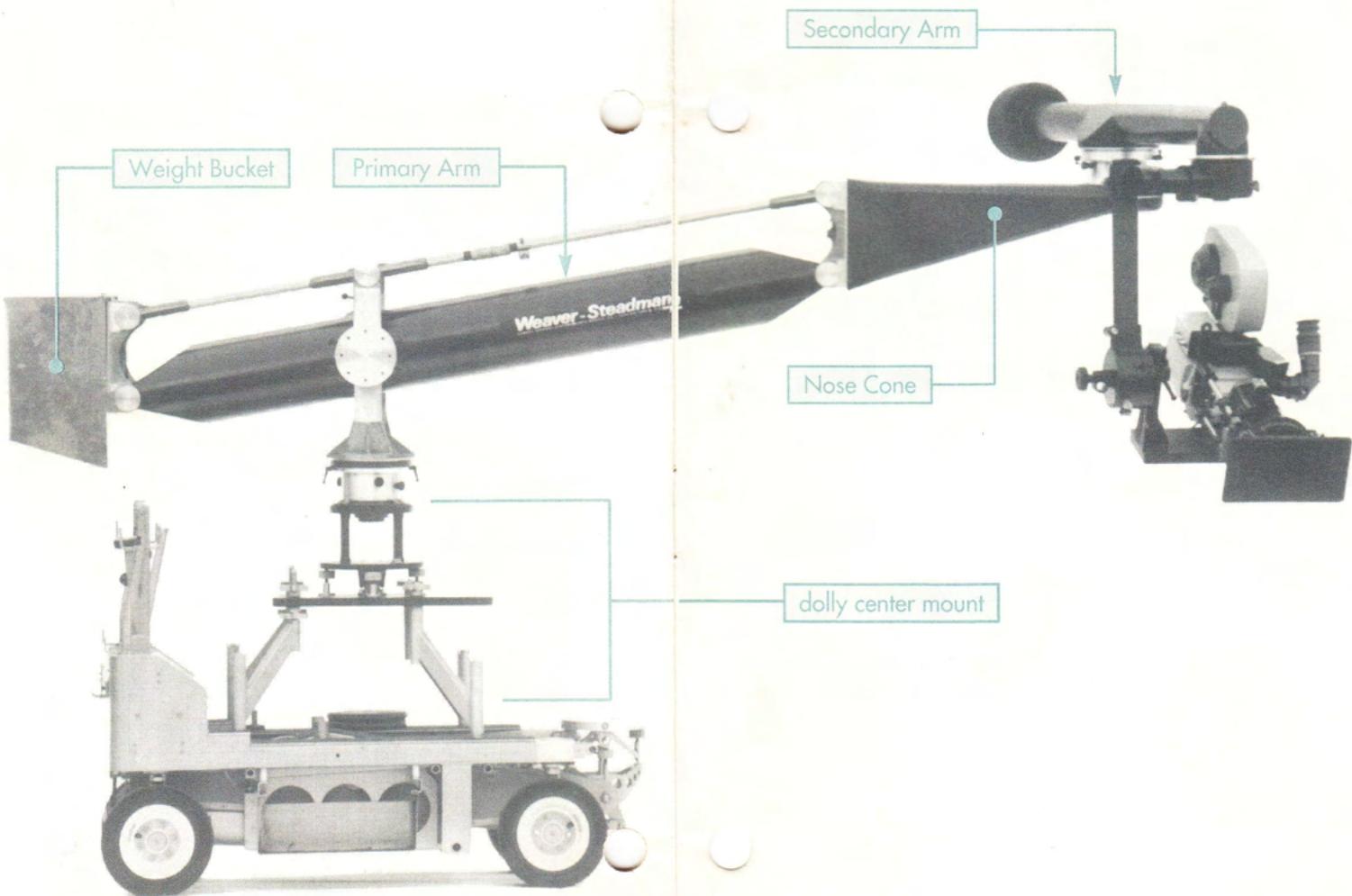
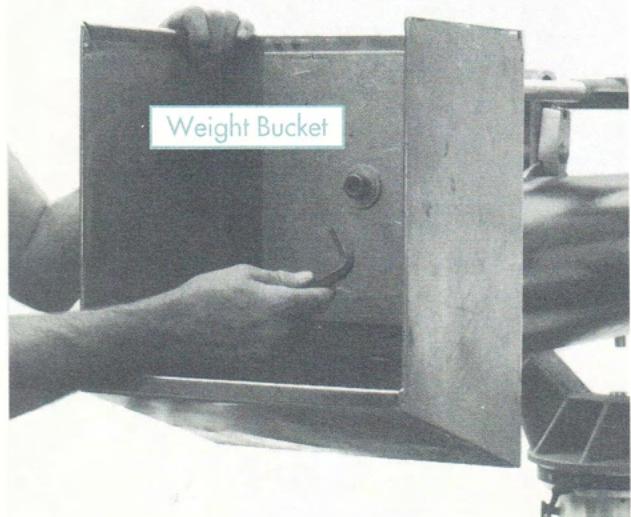
Total shipping weight for Jib Arm, Secondary Arm, Counterweights and container is 451 lbs

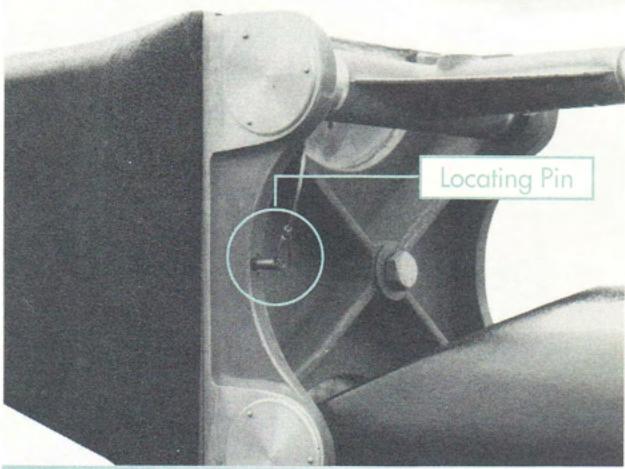
## W/S Multi-Axis Jib Arm assembly

**1** Level the dolly or support rig. Chapman, Fisher and Panther dollies have center-mounting capability which provides the best support for the W/S Multi-Axis Jib Arm.

**2** Mount the Primary Arm on the dolly or support rig. Make sure the Arm is securely attached to the Mitchell mount. To facilitate attachment, hand-tighten the large Nut, and lock the Primary Arm's Pan Brakes. Then, hold on to the Nut as an assistant rotates the Arm in a clockwise direction. Reverse this procedure for disassembly.

**3** Install the Weight Bucket on the Primary Arm's short end; securely tighten the Mounting Bolt.



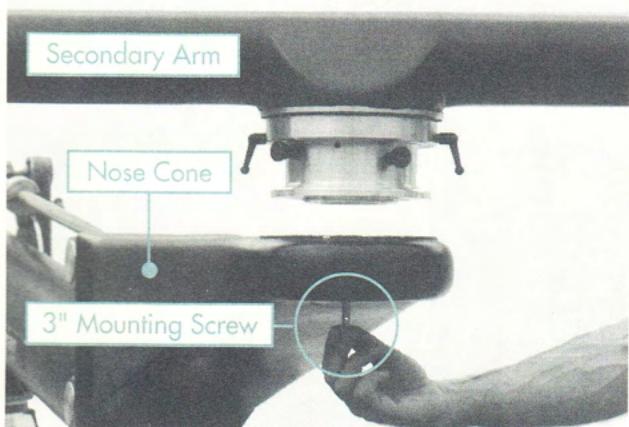


- 4** **Install the Nose Cone** so the round aluminum mount is facing up. Use the locating pins on the Nose Cone's base to make sure it will **not** inadvertently rotate; securely tighten the Mounting Bolt.

- 5** **Support the Primary Arm's long end.** Place a step ladder or apple box under the end of the Arm with the Nose Cone and lower it until it rests on this support. (See photo on page 44)

**6** **Install the Secondary Arm on the Nose Cone.** Thread the Mounting Screw to within 1/2-turn of being seated, allowing the Arm to rock slightly to gage balance between the Head/Camera Package and the Secondary Arm Counterweights. It is very important to **always** balance the Camera Package's weight with equal counterweight. Wait to tighten the Mounting Screw until after assembly and balance are complete.

Place 20 lbs of counterweight in the Primary Arm's Weight Bucket.



- 7** **Install the W/S Head on the end of the Secondary Arm;** securely tighten the Mounting Bolt.

Place an additional 30 lbs of counterweight in the Primary Arm's Weight Bucket.

- 8** **Add Counterweights to the Secondary Arm.** 20 lbs of counterweight is needed to balance the W/S 2-Axis Head; 35 lbs for the W/S 3-Axis Head; 20-50 lbs for a complete Camera Package.

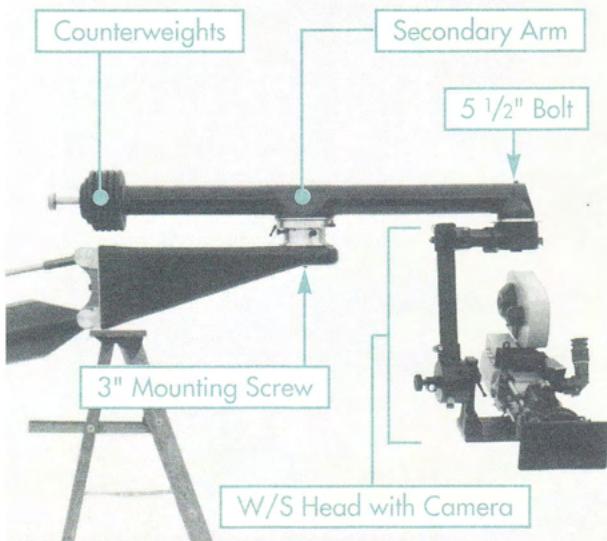
- 9** **Mount the Camera on the Head, and balance.** See details for the 2-Axis Head on pages 10-13; for the 3-Axis Head on pages 23-26.

Place sufficient counterweight in the Primary Arm's Weight Bucket to balance the weight of the Head.

## 10

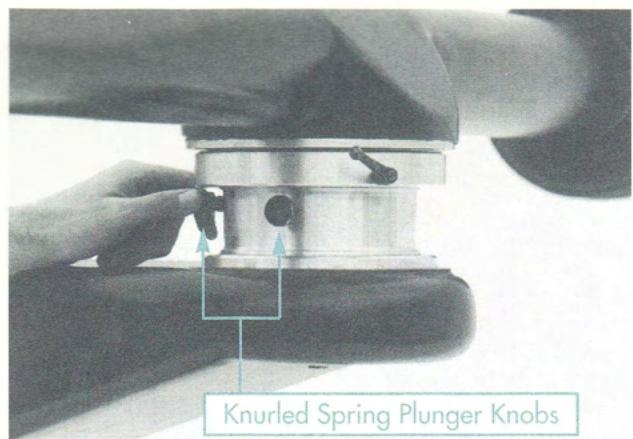
### Adjust the Secondary Arm's balance.

Rock the Arm on its mounting, adjusting the Counterweights until the Camera Package's weight is in balance. Now, tighten the Mounting Screw.



## 11

### Add Counterweights to the Primary Arm's Weight Bucket until the Arm's Nose Cone end gently lifts from its support.



## 12

### Adjust drag resistance on all axes to match that of the head by engaging the Knurled Spring Plunger Knobs.



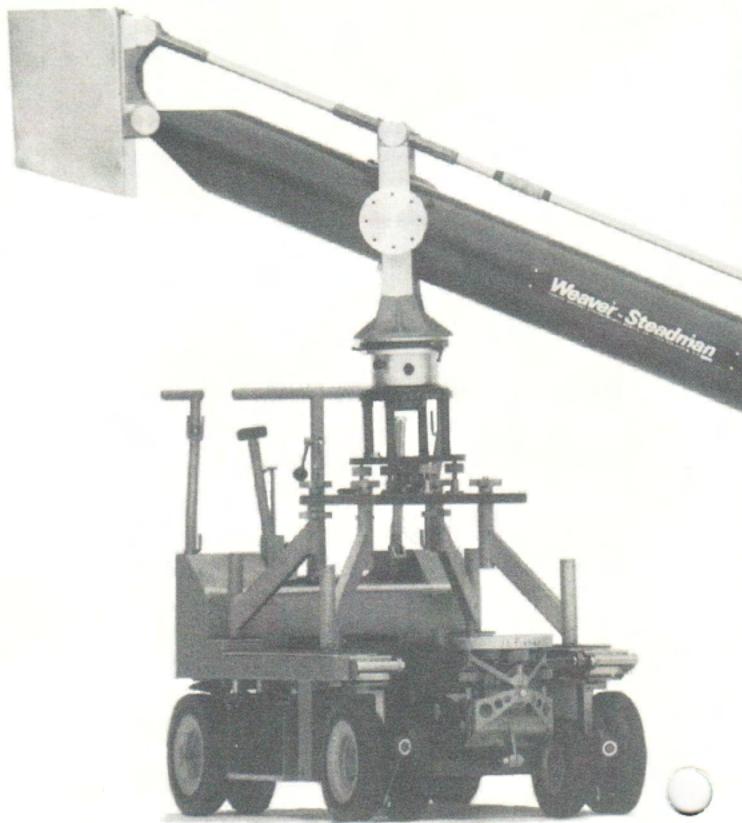
### Note

1. For the Multi-Axis Jib Arm configuration, the Camera Package's weight should be kept as light as possible — especially when using the W/S 3-Axis Head. Heavier Packages create more inertia, making smooth starts and stops difficult. Optimize performance by avoiding 1000' magazines, heavy eyepiece extensions, large matte boxes, or on-board monitors whenever possible.

2. Lead weights are often used for balancing the Primary Arm. For safety, **always** wear gloves when handling these weights, and immediately wash hands when through.

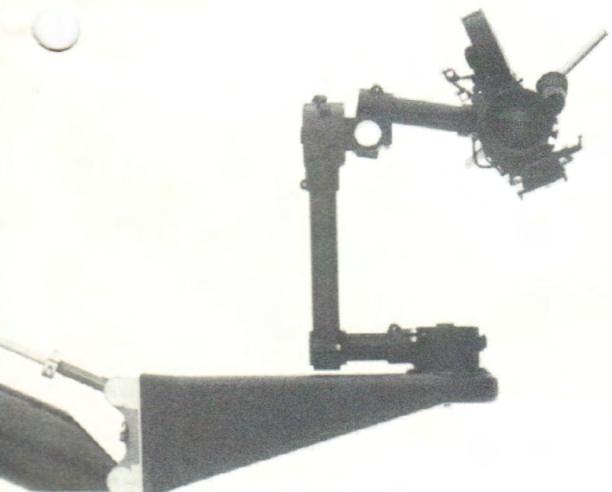
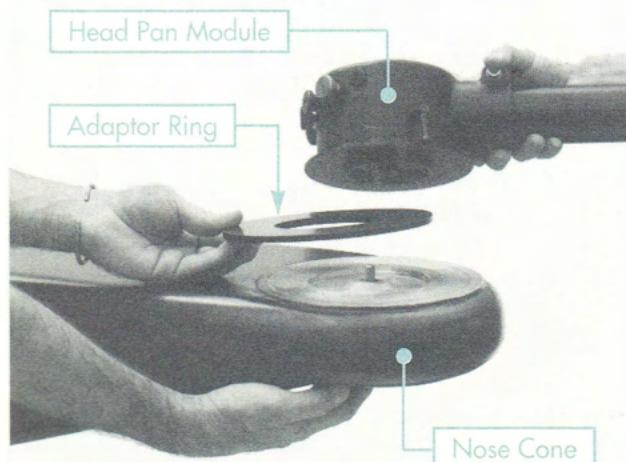
## Standard Jib Arm assembly

The W/S Multi-Axis Jib Arm can be used without its Secondary Arm, to create a more rigid Jib Arm that is excellent for special situations requiring a lighter weight Jib Arm.



**1-5** Follow steps 1 through 5 on pages 40 – 42.

- 6** **Install the Head directly on the Nose Cone,** using the Adaptor Ring. The Nose Cone can be mounted for either an upright or a suspended (underslung) Camera position. See pages 41 – 42, #4. For Head assembly see pages 8 – 11.



**7** **Mount the Camera Package on the Head.**  
See pages 10 – 13.

**8** **Add Counterweights to the Primary Arm's Weight Bucket until the Camera Package is in balance.**

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