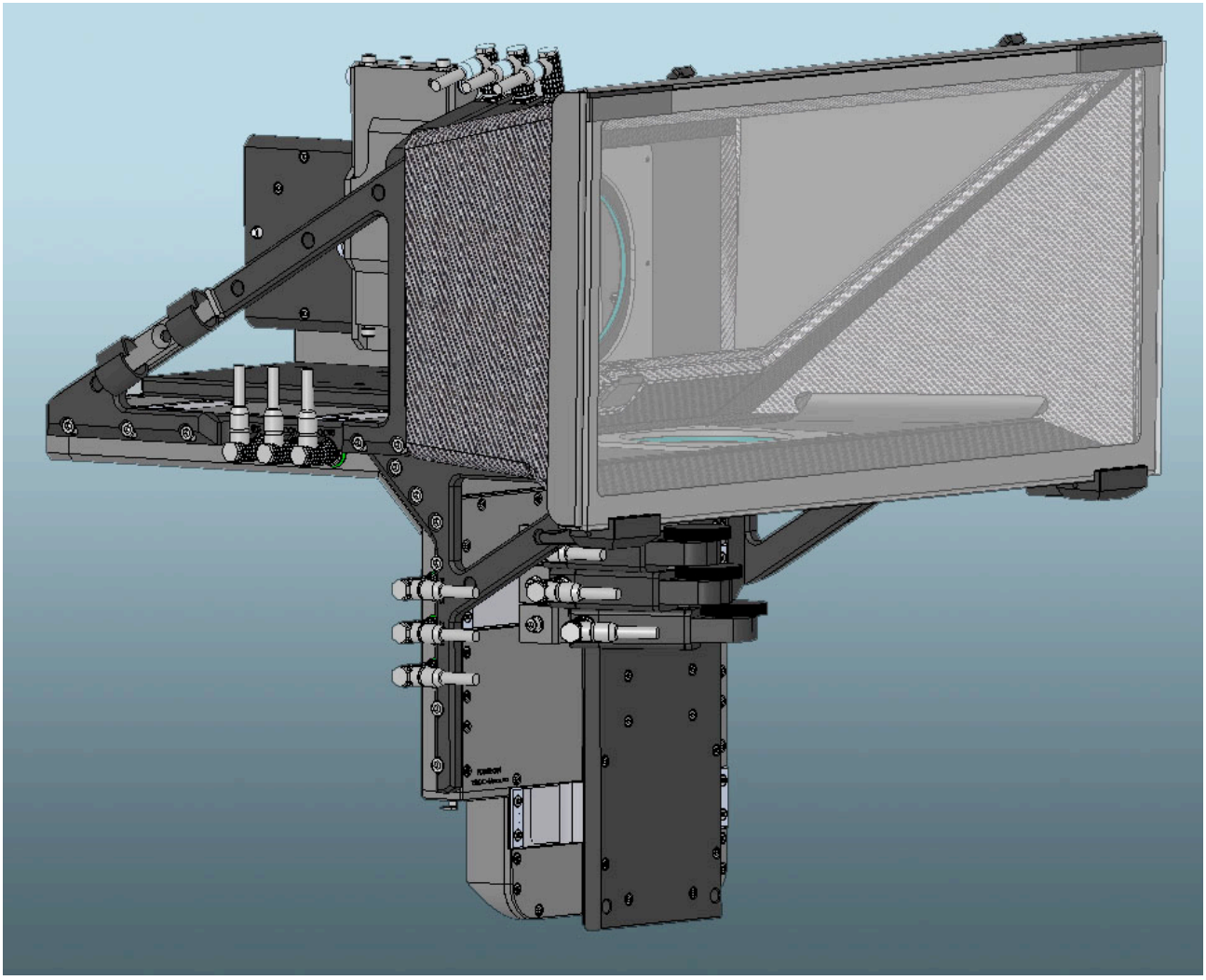
3FLEX™ TS-5-Compact

Compact Beam Splitter Stereo Camera Platform

Version 1.0

User Manual



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Revision History

Revision	Date	Authors	Changes
0.9	3 October, 2010	JiSm	Initial Draft to 3ality
1.0	14 September 2011	JiSm	corrections

Intended Readers

Users, Operators

Subject

How to setup the TS-5-Compact

Document Version/Date

V 1.0 – September 2011

Applicable for Device Version

TS-5-Compact

Filename

TS-5-Compact_UserManual_1.0.doc

Preface

This document contains instruction and reference information for the operation and use of the

3FLEX™ TS-5-Compact_BeamSplitter Stereo Camera Platform

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Laite on liitettävä suojamaadoituskoskettimilla varustettuun pistorasiaan.

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Apparatet må tilkoples jordet stikkontakt.

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Apparaten skall anslutas till jordat uttag.

WARNING:

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CAUTION:

TO REDUCE THE RISK OF FIRE OR SHOCK HAZARD AND ANNOYING INTERFERENCE, USE THE RECOMMENDED ACCESSORIES ONLY.

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- Our Customer Support Representatives are available to provide telephone support during business hours (M-F, 9am-6pm Pacific Time), and after these hours for urgent "emergency" technical support.
- Customer Support will be provided only for products under warranty or those covered under a valid Support Agreement.
- Before returning the Product for repair, it is necessary to obtain a Return Merchandise Authorization (RMA) number by calling (818) 333-3000. You will be asked to provide the system's serial number.
- The non-functioning part should be properly packed and shipped pre-paid to 3ality Technica with the RMA number clearly displayed on the outside of the package and on the accompanying RMA form. We will refuse to accept any package without a valid RMA number.
- Repairs outside the scope of the Limited Warranty require a valid and valid Support Agreement prior to any repairs. 3ality Technica does not offer time and materials based repair services.

2 Introduction

3ality Technica's 3FLEX™ TS-5-Compact BeamSplitter camera platform restores creativity and mobility to the filmmaker. Designed by cinematographers and engineers, this fully motorized stereoscopic platform accommodates a variety of cameras and lenses. Whether you are shooting a feature film or a high-profile sporting event, the TS-5 is your answer to quick and accurate setups, freeing you to shoot 3D on a 2D schedule. 3ality Technica's calibration software is sophisticated, powerful and easy to navigate, providing you with matching zooms and smooth tracking for every shot. In addition, 3ality Technica's proprietary software captures positional metadata every six milliseconds. You can use the metadata to integrate actual camera data into your computer generated environments seamlessly. Whatever you can imagine, 3ality Technica makes it possible.

2.1 Compact BeamSplitter

The 3FLEX™ TS-5-Compact BeamSplitter Camera Platform is the portable alternative to classic BeamSplitter stereo camera rigs. With an Interaxial range of 0-4 inches, this stereo platform allows the 3D creator to capture depth from very close to about 20 feet away.

2.2 Height/Pitch-Unit

The Height/Pitch unit is unique to all 3ality Technica 3FLEX™ stereoscopic camera systems. Mounted on the TS-5 alongside the right-eye camera (or through-eye), this enables the software system to compensate for vertical misalignments, which are primarily caused by irregularities in the internal mechanisms of zoom lenses.

2.3 Typical In-System Configuration

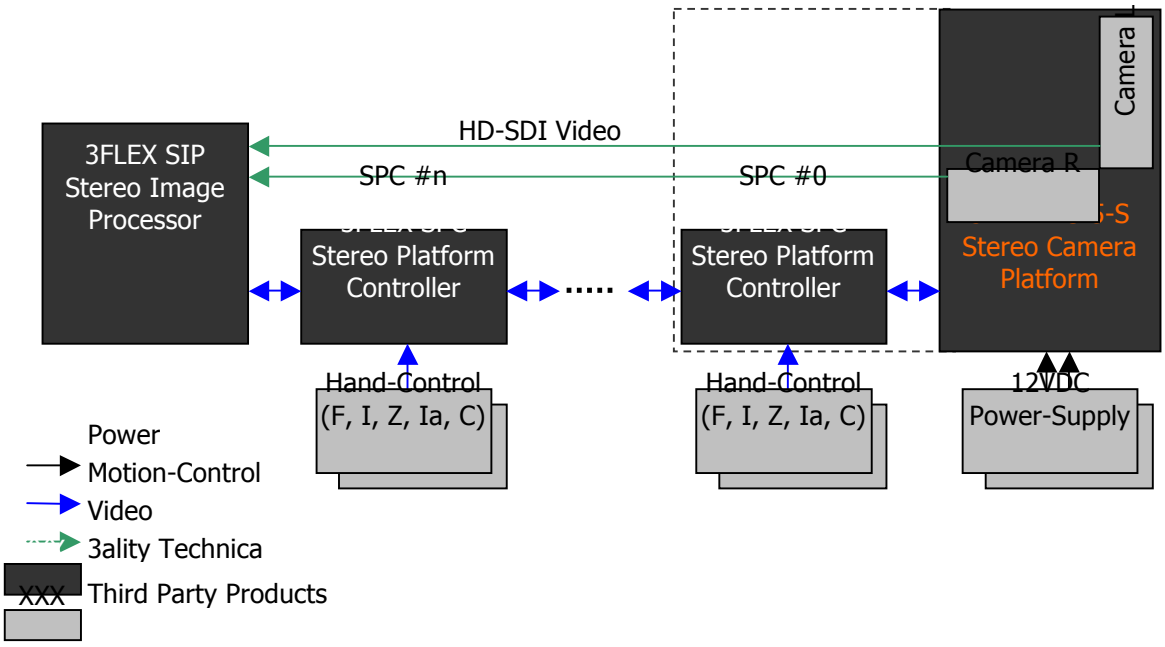


Figure 1. Typical In-System Configuration

2.4 Rig Overview

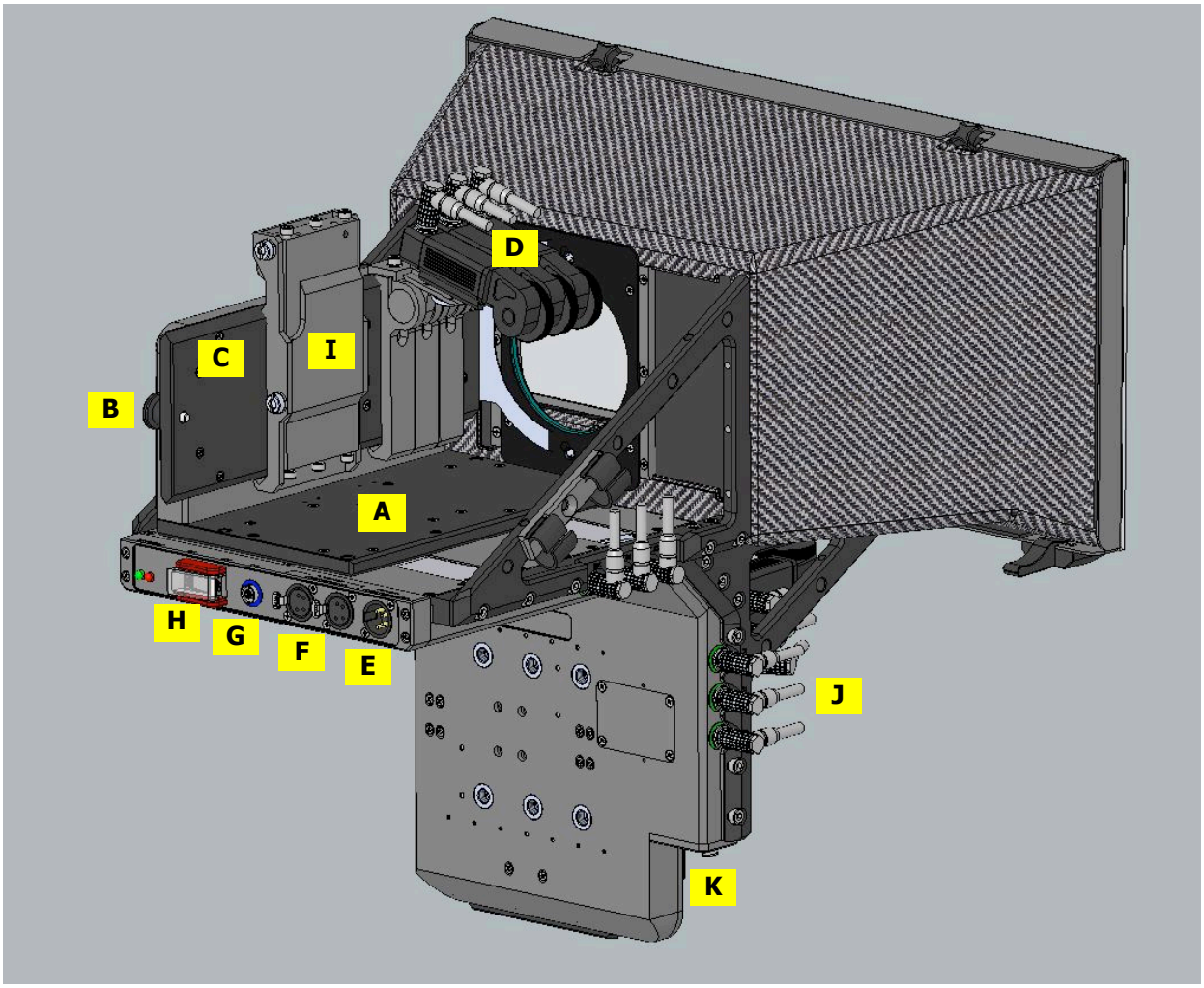


Figure 2. View from Above Right without cameras and lenses.

No.	Description	Comment
A	Base Plate	
B	Locking Safety Pin	
C	Height/Pitch Unit	
D	Lens Motors	Right Eye
E	Power In	XLR 4 pin male. Input from power supply (3ality proprietary Y power cable)
F	Power Out	XLR 4 pin female
G	10-Pin Lemo to SPC	
H	MRCU board with power switch	Contains motor drivers and controls
I	Camera support plate with roll axis adjustment	Custom camera mounts attach here
J	Lens Motors cables	Left Eye
K	Left Camera Power Out	XLR 4 pin female

2.5 Lens Control Connectors

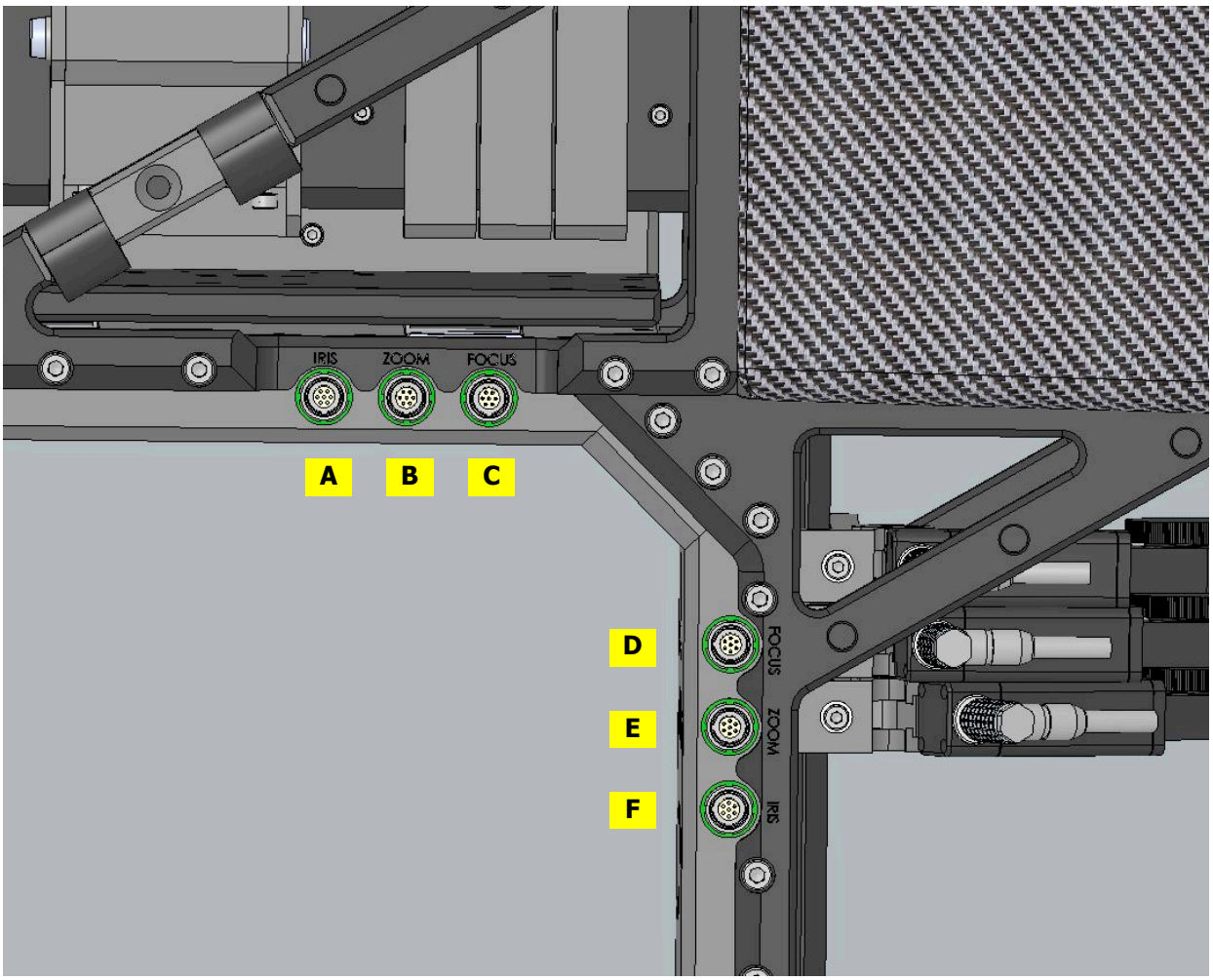
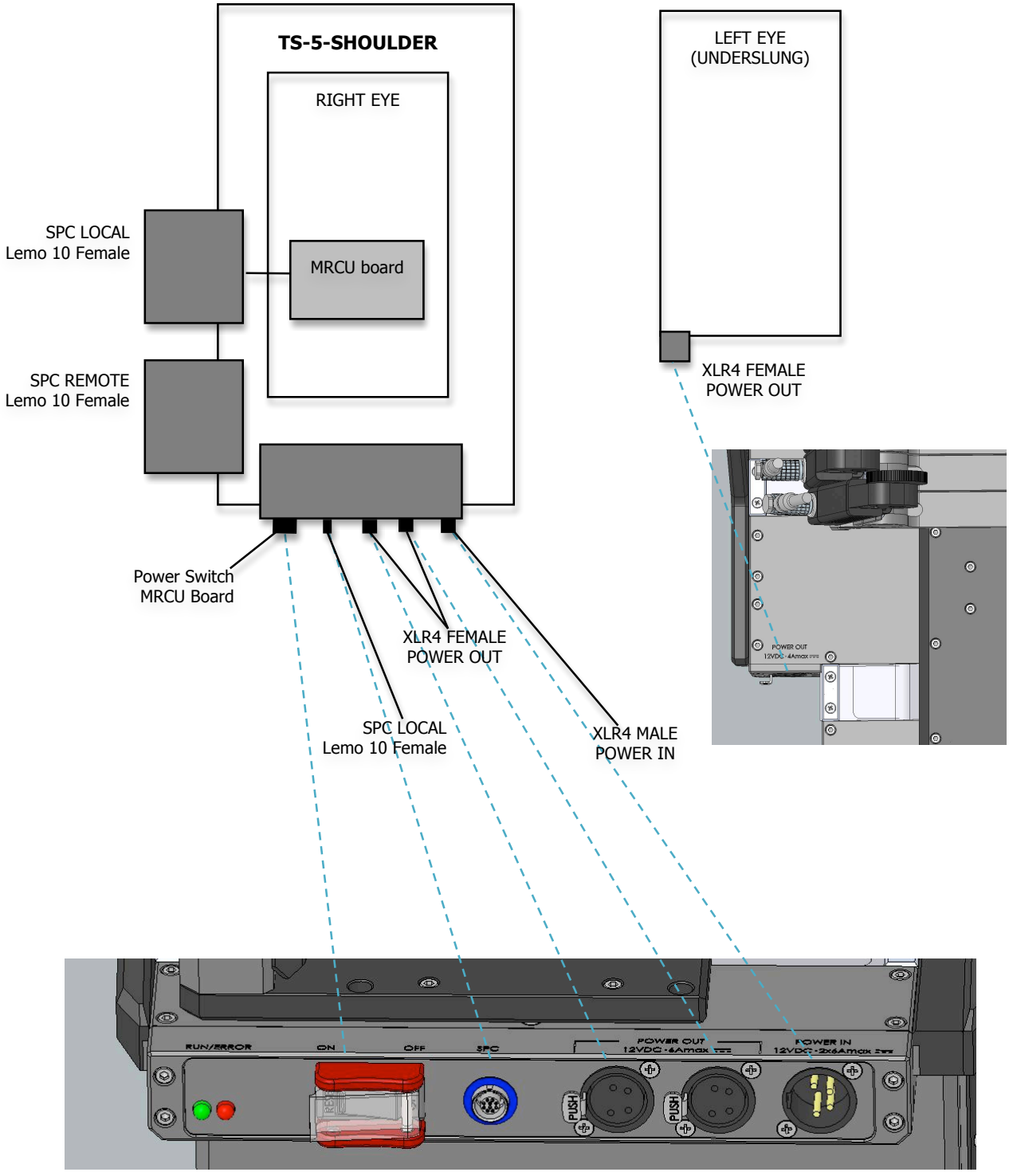


Figure 3. Lens Motor Supplies shown for both cameras

No.	Description	Comment
A	Right Iris motor Lemo port	
B	Right Zoom motor Lemo port	
C	Right Focus motor Lemo port	
D	Left Focus motor Lemo port	
E	Left Zoom motor Lemo port	
F	Left Iris motor Lemo port	

Note: All connectors are 7-pin Lemo.

2.6 TS-5-Compact Internal cabling



3 Before you start

3.1 Safety

3.1.1 General Safety Instructions

1. Restrict camera platform operation to qualified personnel only.
2. Read these instructions.
3. Read these instructions again.
4. Keep these instructions.
5. Heed all warnings.
6. Follow all instructions.
7. Do not use this apparatus near water.
8. Clean only with dry cloth.
9. Do not install near any heat sources such as radiators, heat registers, stoves, or other apparatus (including amplifiers) that produce heat.
10. Protect the power cord from being walked on or pinched particularly at plugs, convenience receptacles, and the point where they exit from the apparatus.
11. Only use attachments/accessories specified by the manufacturer.
12. Unplug this apparatus during lightning storms or when unused for long periods of time.
13. Refer all servicing to qualified service personnel. Servicing is required when the apparatus has been damaged in any way, such as power-supply, its cord or its plug is damaged, liquid has been spilled or objects have fallen into the apparatus, the apparatus has been exposed to rain or moisture, does not operate normally, or has been dropped.

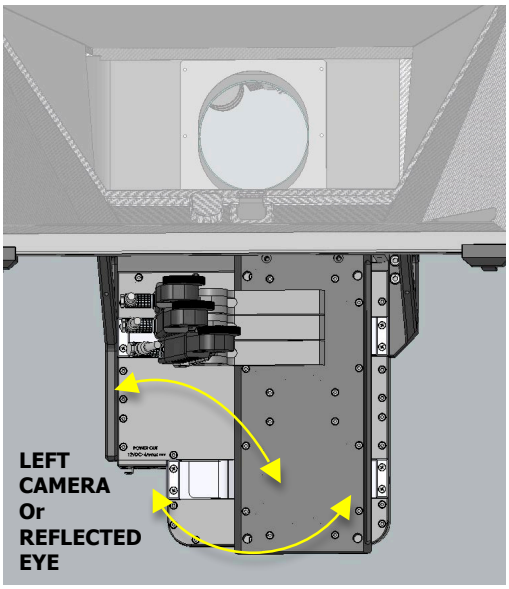
3.1.2 Specific Safety Instructions

1. In case of outdoor usage, make sure that it the TS-5-Compact BeamSplitter is not exposed to moisture or rain. Use appropriate covers in case of moist or wet weather-conditions!
2. In order to prevent overheating, make sure that the device is properly vented, especially when used under protective covers!
3. Use only certified power-supplies with an internal current-limiter (fuse or trip-switch). Set this limiter to 6 Ampere max. Make sure that the voltage of your power-supply has a nominal voltage of 12VDC with a tolerance of not more than -10% / +25% (10.8-15VDC)!
4. Ensure that the TS-5-Compact BeamSplitter is always secure on a table, or mounted safely on a tripod, fluid-head, remote-head, Steadi-Cam etc. with sufficient load capacity!
5. Ensure that your connector of the power-supplyis always easily accessible!
6. Disconnect this "power in" connector before any assembly or service work!

Be highly attentive when reaching into the camera platform while in use, to prevent injuries from (unpredictable) movement.

Do not grab under the Height/Pitch Unit at any time.

See picture below for motorized movement areas.



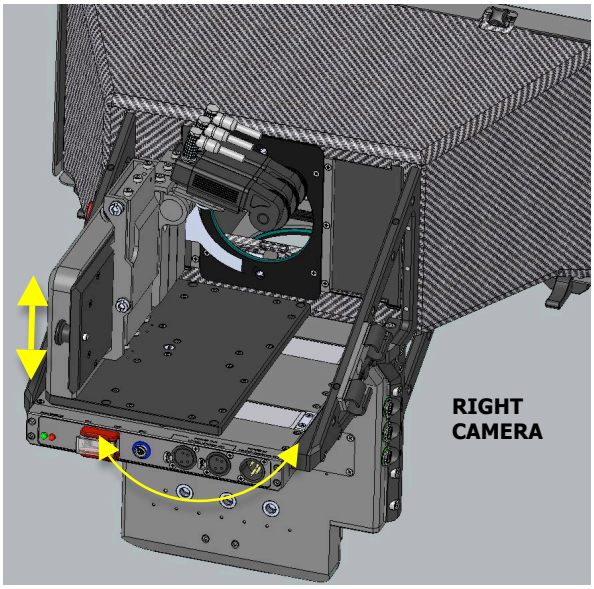


Figure 4. Moving Parts

Camera platforms angle toward and away from each other when converging.

Height/Pitch unit moves vertically. (On right camera platform only)

Camera platforms and angle toward and away from each other when converging

3.2 Parts needed

Pos	Quantity	Description
1.	**1**	3flex TS-5-Compact BeamSplitter 3D Camera Platform
2.	**2**	3flex TS-5-Compact BeamSplitter 3D Camera Platform Camera/Lens Sleds One Camera/Lens Sled consists of • **3** – Heden lens motors
3.	**2**	Cameras
4.	**2**	Camera mount adaptors appropriate to camera type
5.	**2**	matching zoom lenses
6.	**6**	Heden lens motor interface cables (7pin Male Lemo)
7.	**1**	SPC motor control interface box
8.	**1**	SPC motor control interface box cable.
9.	**1**	12 volt "Y" power cable. (4pin Female XLR to 2 – 4pin Male XLR)

4 Preparing the Stereo Camera Platform

4.1 Camera/Lens sled assembly

1. Disconnect platform power.
2. Remove camera sled from camera platform by loosening the knob above the height/pitch bracket.
3. Carefully pulling the spring-loaded safety-lock knob, remove the sled from the platform. (The knob is designed to catch in each of the camera platform's grooves).

   Take care not to force anything.

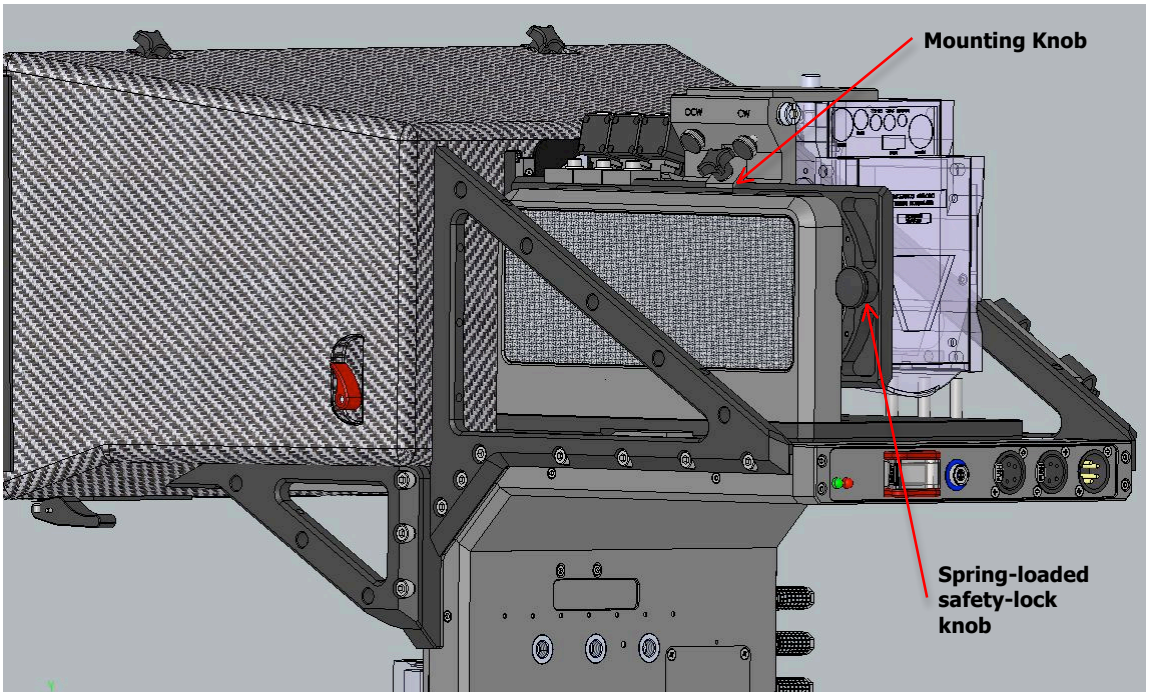


Figure 5. Right eye camera assembly

4.1.1 Camera Mounts

4. You will have camera mounts for the camera you specified to 3ality Technica at the time of purchase. If you have multiple cameras, ensure you are using the set designated for your camera.

1. Attach mounting brackets to top and bottom of camera body (1, 2)

2. Attach mounted camera body to top and bottom of dovetail plate. (camera body remains detached in the center). (3, 4)

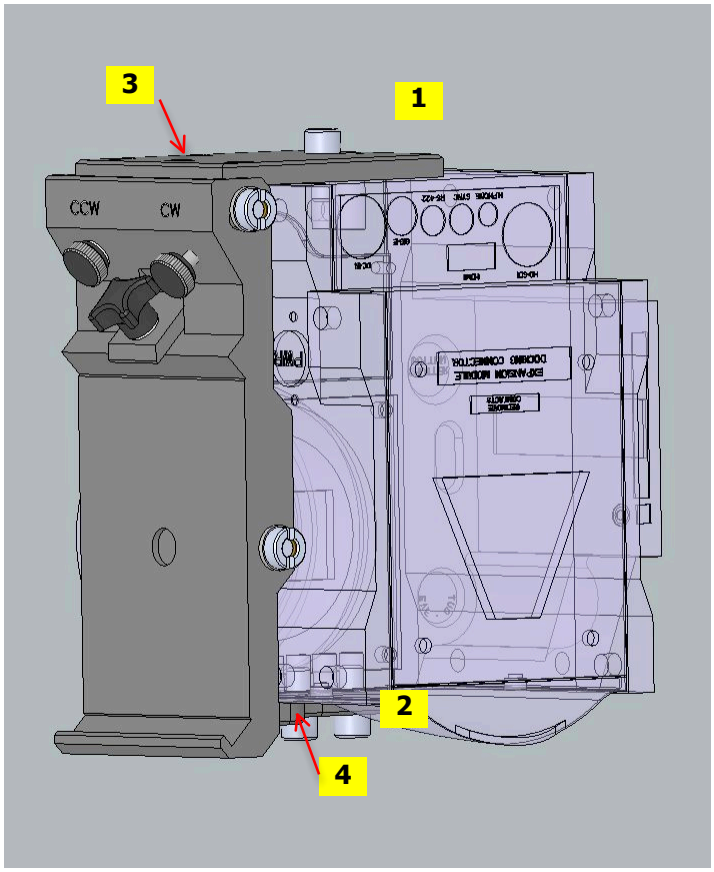


Figure 6. Mounting brackets and dovetail

1. Slide motor brackets onto plate (1)

2. Slide motors onto brackets (2)

3. Tighten into place. Note: This knob tightens both the bracket to the base, and the motor into place. (3)

4. Attach mounted camera body to camera sled.

Figure 7. Motor Brackets

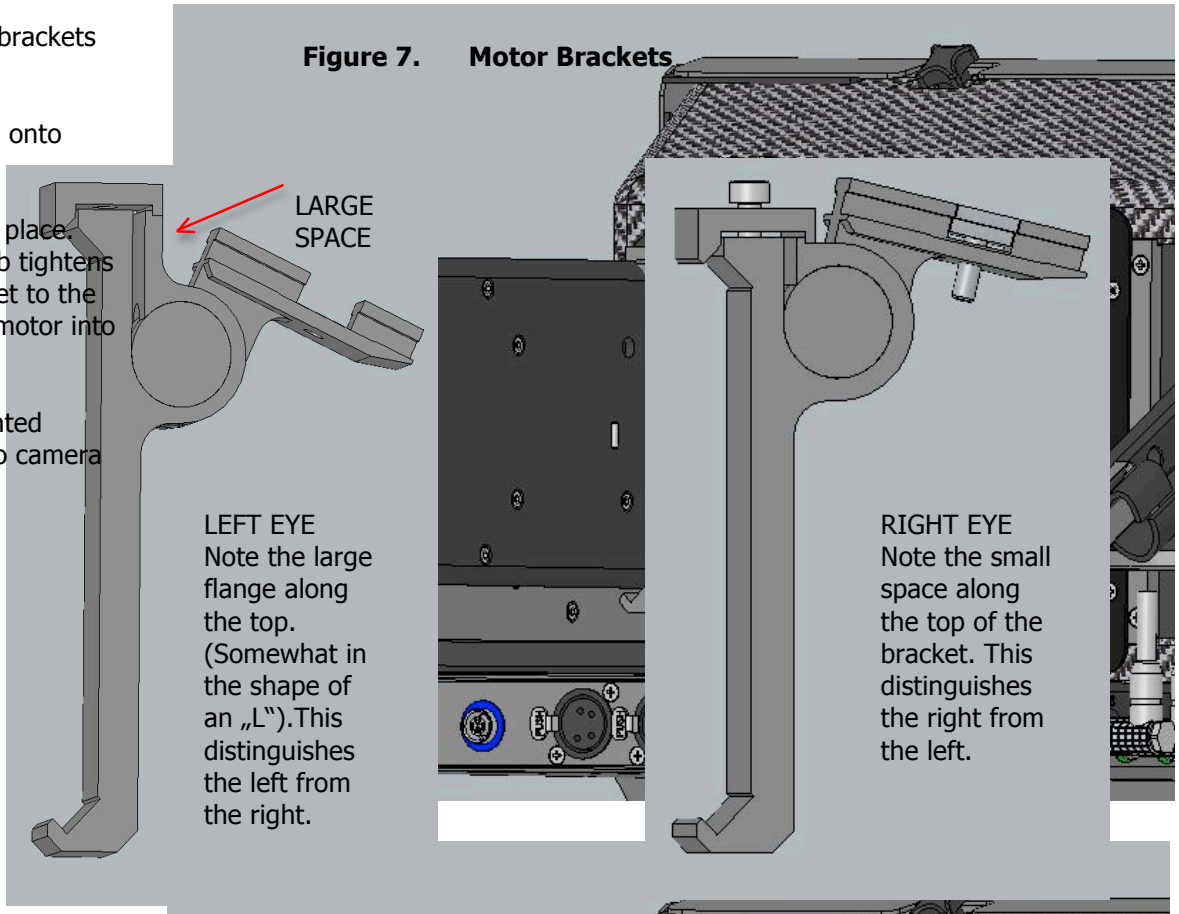
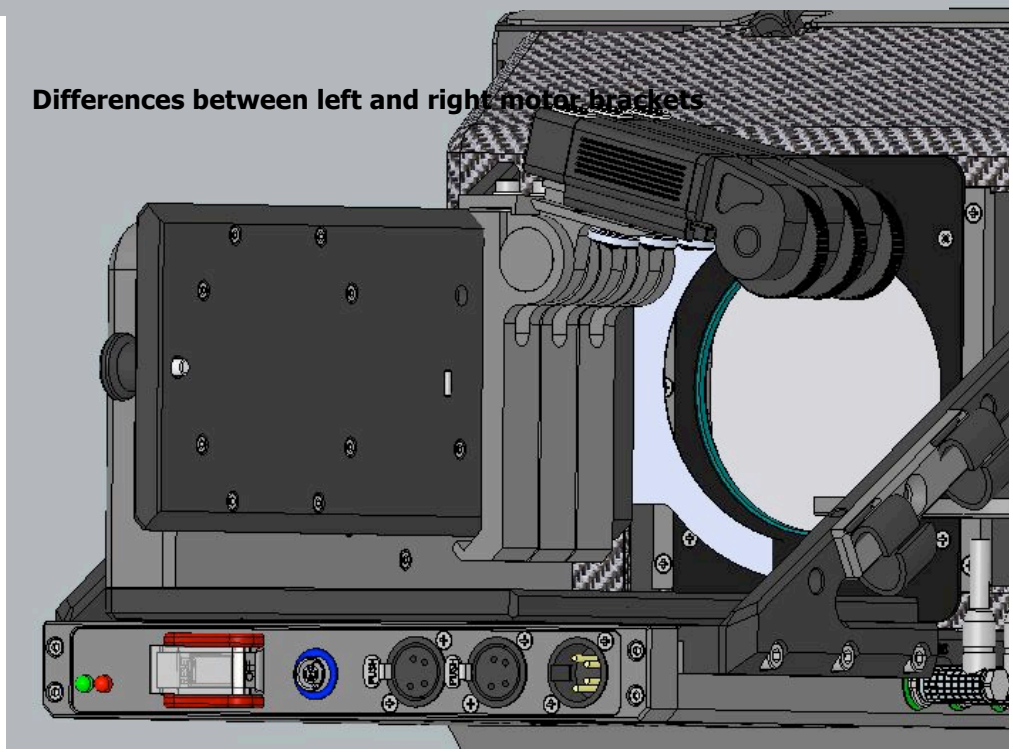


Figure 8. Differences between left and right motor brackets



4.1.2 Mounting Brackets, Motors and Camera

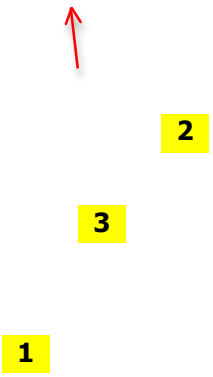
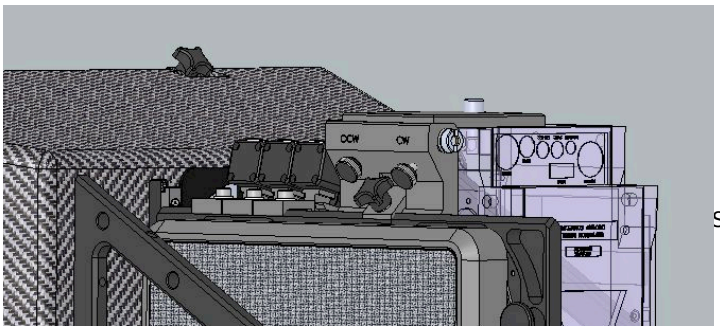


Figure 9. Rig body, sled and motors.

1. Mount camera on sled (safety screw will help you place the camera/lens onto the rig) (1)

2. Lock with locking clamp.

Figure 10. Camera mounted on sled



4.2 Installing the Beamsplitter

Note: Beamsplitter / Mirror removal and installation is not for the faint of heart. It requires great care and confidence. Do not hurry this process!

Tools: Soft cotton disposable gloves, clean compressed air or photo grade canned air, sticky tape style lint roller brush. Pancro or Alcohol-only glass cleaner.

Tip: To determine the reflective side of the glass, use a non-abrasive object (rubber eraser, cotton gloved finger, etc.) and touch the surface of the mirror. If you can touch your own reflection, it is the reflective side of the mirror. If there appears to be a gap between your object and the reflection, it is the anti-reflective side of the mirror.

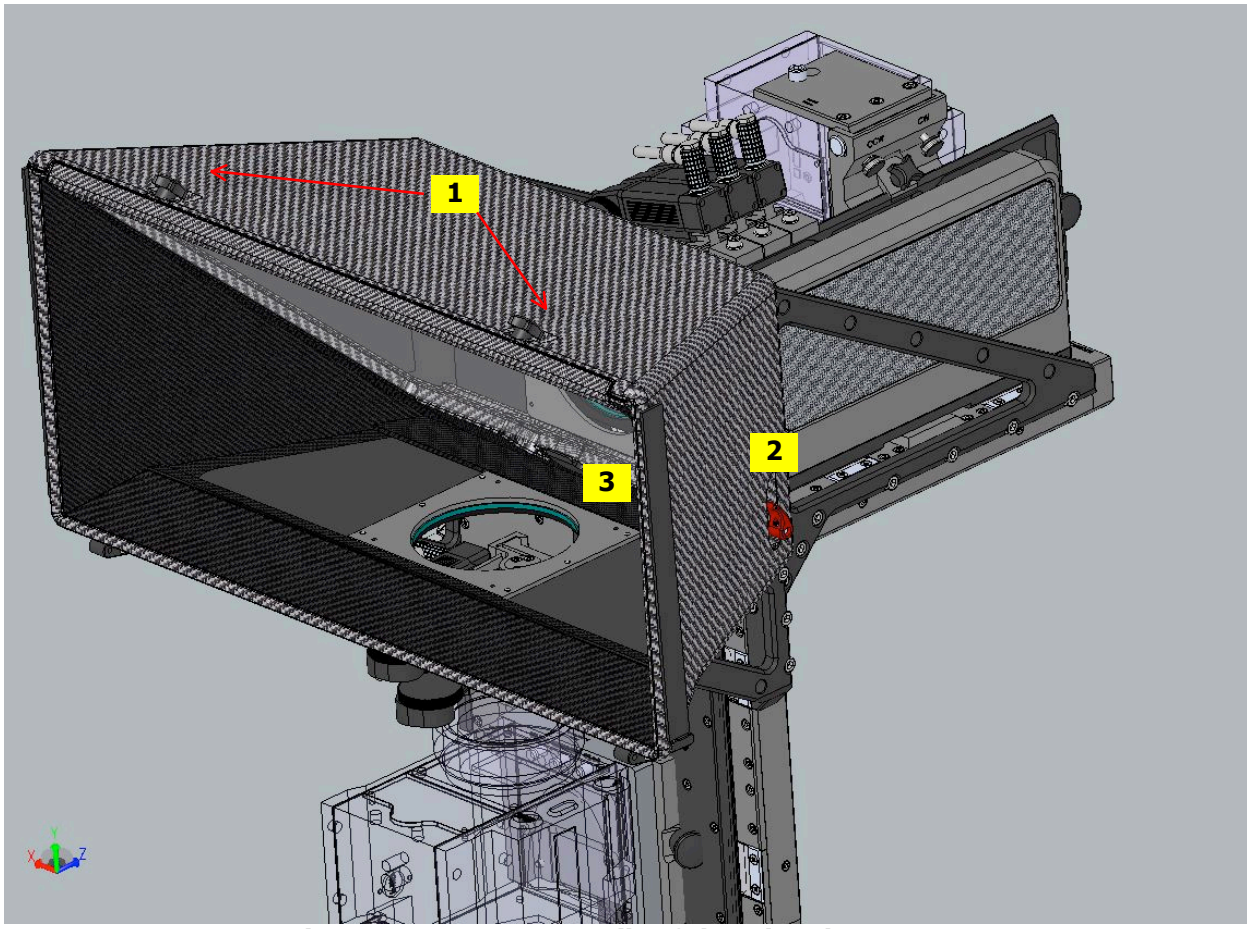


Figure 11. Inner Details of the Mirrorbox

1. Disengage the upper clamps (1), and remove the security strip from the top of the mirror box. Place it to the side.
2. Disengage the lower inner clamp (2).
3. Eliminate any lint and dust particles that have accumulated on the black velvet mirror box interior. Use the compressed air and lint roller tools to accomplish this.
4. Clean the inside, reflective side of the mirror.
5. Using the soft cotton gloves, hold the mirror with 2 hands, anti-reflective side up, from the bottom or the edge of the mirror. The bottom edge is the narrowest part of the trapezoid shape.
6. Carefully insert the glass into the mirror box guides and behind the lower clamp. The mirror will be secure when it finds the upper groove of the mirror box guide. Be careful to place the mirror into its frame, rather than dropping it into place.
7. Once the mirror is in place, close the side mirror clamp (2). The mirror is now secured.

8. Replace the top bar, taking care with the clamp. To do this, first contact the mirror's surface with the rubber tips, and then snap into place, securing the bar with the locking screws.

4.2.1 Removing and Cleaning the Beamsplitter

Note: Beamsplitter/mirror removal and installation is not for the faint of heart, and requires great care and confidence. Do not hurry this process!

A clean beamsplitter is a prerequisite for premium quality images. While there are many ways to clean a mirror, these are our recommendations.

At 3ality, we prefer lens cleaners that contain Isopropyl Alcohol and not much else. Pancro lens cleaning fluid is our favorite. http://www.filmtools.com/panlencleanf.html. Also we prefer the Kimtech Kimwipes, part number 34256. www.kimtech.com. While non-abrasive, normal lens tissues are far too small and not absorbent enough for such a large task.

We also recommend the use of disposable white cotton inspection gloves for the handling of the glass. Dispose of the gloves after a single use, as they collect dirt and oil you do not want on your glass.

Start by using clean and dry pressurized air of some type to clear any hard deposits that might scratch the surface of the glass while wiping. When you are satisfied that any hard debris has been cleared, proceed to spray the glass cleaner on the mirror. The Pancro fluid is a fine mist spray. We recommend the spraying of the entire surface of the glass. Usually 3 to 4 pumps of spray should cover the glass.

Using the Kimwipes, We recommend that you crumple the large tissue into a loose ball. Wet the Kimwipe with a little pancro: Dry Kimwipes may still be abrasive to the coating. Wipe the surface gently with the crumpled Kimwipe until dry. Discard the used Kimwipe. Inspect the mirror for further cleaning. Start over again if needed. Depending on the amount of accumulated oil and dirt, you may need several applications of cleaner and wipes before you are satisfied.

The same applies to the anti-reflective side of the glass. At 3ality, we clean the reflective side of the TS-5 before installation. However, over time or exposure to smoke and dirty environments, you will need to remove and clean the anti reflective side again.

Tip: For determining the reflective side of the glass, use a non-abrasive object (rubber eraser, cotton gloved finger, etc.) and touch the surface of the mirror. If you can touch your own reflection, it is the reflective side of the mirror. If there appears to be a gap between your object and the reflection, it is the anti-reflective side of the mirror.

Always discard the wipe after first use. NEVER reuse the Kimwipe. You will reapply the dirt to the glass.

5 Specifications

5.1 Physical

Dimensions (without cameras and lenses)	L = 540 mm or 21” W = 760 mm or 30” H = 330 mm or 13”
Weight (without cameras and lenses)	32.7 kg (72 lbs)
Operating Height	< 3000 m above sea level
Operating Conditions	Temperature 0 °C to 45 °C or 32 to 113°F Rel. Humidity 20% … 80% (non condensing)
Storage Conditions	Temperature -10 °C to 55 °C or 15 to 131°F Rel. Humidity 0% … 80% (non condensing)
Power-supply	12V DC • 2 x 6Amax Used power-supplies must be compliant with the regulations in the countries used and must be current-limited to 6Amax by means of fuses, circuit-breakers or trip-switches!
Tolerance of Power-Supply	$^{+25\%}_{-10\%}$ (10.8 to 15V)
Ingress protection	IP20. Designed for indoor usage only! If used outdoors, use appropriate protection measures to prevent exposure of the device to moisture and rain!
RoHS compliance	YES
Interaxial Range	Right eye camera movement 4 to 20 inches or 500 mm
Convergence Range	Convergence each camera -1° to 3°
Currently supported Camera Types	All full-body HD cameras; Box cameras with optional dove-tail mount.
Height of optical center + camera mount	96 mm
Lens Type	Max. Front Lens Diameter 100 mm; up to 135mm with optional large lens bracket.
Focal Lengths	2/3” Imager 6.5 mm to + 125 mm Super 35 Imager 18 mm to + 250 mm
Height / Pitch Adjustment	Height Range ± 12.6 mm Pitch Range ± 3.7°
Rotation	Camera roll axis (turn round centerline) ± 2°
Plane Flatness	Absolute rail deviation end to end ± 0.05 mm
Positional Accuracy	Drive Accuracy 3 ☐m, Encoder Accuracy 1 ☐m
Feedback Method	Linear encoder, on final stage (post gearing, etc.)
Drive Speed	Interaxial 50.8 mm/s (2”/s)
Tripod Head Mount	Multiple UNC3/8-16 female threads

5.2 Connectors and Interfaces

5.2.1 Lens-Motors

Lemo 7pin female receptacle assignment

Pin	Function	Direction
1	Motor M-	Output
2	Motor M+	Output
3	Encoder A	Input
4	+5VDC	Output
5	GND	-
6	Encoder B	Input
7	n.c.	-

Rear-view on TS-2-s: Female Lemo7 receptacle

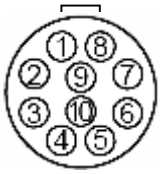
Connector on TS-4-S LEMO 7pin, female receptacle, Size 1B

ATTENTION: Use shielded cables only!

5.2.2 SPC/SIP I/O

Lemo 10pin female receptacle assignment

Pin	Function	Direction
1	+12VDC	Output
2	GND	-
3	TA+	Output
4	TB-	Output
5	RA+	Input
6	RB-	Input
7	n.c.	-
8	n.c.	-
9	+12VDC	Output
10	GND	-



Rear-view on TS-2-s: Female Lemo10 receptacle

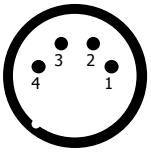
Connector on TS-4-S LEMO 10pin, female receptacle, Size 1B

ATTENTION: Use shielded cables only!

5.2.3 Power Input

Voltage 12VDC $^{+25\%}_{-10\%}$ (10,8-15VDC)

XLR pin assignment
1. 0V / GND for electronics, internal motors and power-output X6 at right camera
2. 0V / GND for power-outputs X27 at left camera
3. +12V for power-outputs X27 at left camera
4. +12V for electronics, internal motors and power-output X6 at right camera



Rear view on TS-4-S:

Current 2 x 6Amax, externally limited

Connector TS-4-S NEUTRIK XLR 4pin, male

ATTENTION: Use only power-supply or battery-pack, which is compliant with the regulations in your country and make sure, that the current of your power-supply is internally limited to 6Amax by means of fuses or circuit-breakers!

The usage of the following Y-cable is recommended:

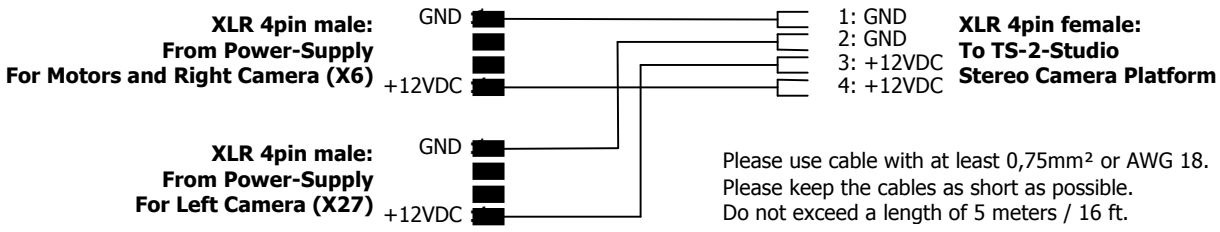
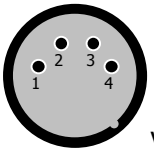


Figure 12. Recommended Y-Power Cable

5.2.4 Power Outputs

Voltage 12VDC $^{+25\%}_{-10\%}$ (10,8-15VDC)

XLR pin assignment
1. 0V / GND
2. n.c.
3. n.c.
4. +12V



View on TS-4-S:

Current Total current for all Power-outputs (OUT1, OUT2, OUT3) together: 6Amax

Connector TS-2-s NEUTRIK XLR 4pin, female

5.3 Mechanical

Attention:

- All dimensions in mm
- Dimensions are rounded
- Not to Scale
- TS-5-Compact Camera Platform is shown with an arbitrary camera and an arbitrary lens
- Design details might change without prior notice

6 Appendix

6.1 Declarations of Conformity

6.1.1 CE

CE

DECLARATION OF CONFORMITY

This declaration is valid for following product:

Equipment: **Stereo Camera Platform**

Type: **3FLEX™ TS-2-Studio**

Hereby the equipment is confirmed to comply with the requirements set out in the Council Directive on the Approximation of the Laws of the Member States relating to Electromagnetic Compatibility (2004/108/EEC).

The following company is responsible for this declaration:

3ality Digital Systems LLC.
55 E. Orange Grove Ave
Burbank, CA 91502
United States of America

Authorized Representative in the EC:
3ality Digital Systems GmbH
Gut Mergenthau
D-86438 Kissing
Bavaria / Germany / Europe

The measurements were carried out in accredited laboratories.

For the evaluation of above mentioned Council Directives for Electromagnetic Compatibility and for Low Voltage following standards were consulted:

- EN 61000-6-2:2005 – General Standards: Immunity for Industrial Environments
- EN 61000-6-3:2007 – General Standards: Emission standards for residential, commercial and light-industrial environments

Kissing / March 15th, 2010
Place / Date

ppa. Th. Eberhardt
Signature of responsible Person

Figure 13. CE Declaration of Conformity