

DEEPSEA POWER & LIGHT

SAN DIEGO * CALIFORNIA * USA
PHONE: (858) 576-1261 FAX: (858) 576-0219

TECHNICAL PUBLICATION

TECHNICAL MANUAL

FOR THE

MSC-1010 __-__ WIDE ANGLE BLACK & WHITE CAMERA (6000 METER)

DOCUMENT NUMBER:
REVISION: NONE
AUGUST 22, 1994

PROJECT:		USED ON:	MSC-1010
FILENAME:		NEXT ASSY:	
REVISION NOTES:		ENGINEER:	D.WAYNE
		DATE (ORIG.):	22 AUG.1994
		CHECK:	

CAMERA SERIAL. # _____

TABLE OF CONTENTS

1.0	GENERAL
1.1	LIMITED WARRANTY
2.0	MECHANICAL
2.1	VIDEO
2.2	ELECTRICAL
2.3	OPTICAL
2.4	ENVIRONMENTAL
3.0	GENERAL OPERATION
3.1	CABLE CONNECTIONS
3.2	HOUSING DISASSEMBLY IRIS ADJUST
3.3	CAMERA ORIENTATION CAMERA FUSE REPLACEMENT ELECTRONIC SHUTTER SWITCH ACCESS
3.4	RE-FOCUSING CAMERA
3.5	ADDENDUM

1.0 GENERAL

The MSC-1010 contains a 1/3-inch black & white CCD video camera that provides high resolution and sensitivity. Housed in a titanium housing with a high quality optical glass dome.

1.1 LIMITED WARRANTY

DeepSea Power & Light, Inc. (DeepSea) warrants all of its products (except internal electronic components), unless otherwise noted, to be free from defects in workmanship and materials for a period of one year from the date of shipment from the factory. Internal electronic components are warranted for 90 days from the date of shipment from the factory.

DeepSea is not responsible for warranty service should the product fail to be properly maintained or fail to function properly as a result of misuse, abuse improper installation, neglect improper shipping, damage caused by disasters such as fire, flood, and lightning, or unauthorized repair or modifications.

Should your DeepSea product prove defective during the warranty period, promptly notify DeepSea to obtain an RMA# (return material authorization number), and return product, freight prepaid. DeepSea will at its option repair or replace the product or defective portion without charge for parts or labor, or at DeepSea's option, refund purchase price. DeepSea will pay for return ground transportation on warranty repairs.

Products repaired or replaced under this warranty shall be warranted for the un-expired portion of the warranty applying to the original product(s).

No warranty or affirmation of fact, expressed or implied, other than as set forth in the limited warranty statement above is made or authorized by DeepSea. DeepSea disclaims any liability for product defect claims that are due to product misuse, improper product selection, or misapplication. Any liability for consequential and incidental damages is expressly disclaimed. DeepSea's liability in all events is limited to, and shall not exceed, the purchase price.

2.0 MECHANICAL

Housing Material:	6AL4V Titanium (Tiodized)
Dome Material:	Optically polished Borosilicate glass
Outer Diameter:	3.0 in. (76.2mm)
Overall Length:	6.3 in. (160mm) Without crash guard
Weight in Air:	840g (1.85 lb.)
Weight in Water:	340g (.75 lb.) In fresh water

2.1 VIDEO

Image Sensor:	1/3-inch CCD
Number of Pixels:	537 (H) x 505 (V) (EIA)
Resolution:	400+ TV lines horizontal
Scene Illumination:	0.05 Lux at f1.2; 0.27 Lux at f2.8
Signal to Noise:	More than 45dB (AGC off)
Iris:	CCD/ Electronic or Manual
Video Output:	1.0 volt 75 ohm (peak to peak)
Video Format:	EIA (RS170) CCIR

2.2 ELECTRICAL

Power:	11-30 volts DC
Current:	110mA
Connector:	___ LPBH4MP ___ BH4MP ___ LPBH7MP

2.3 OPTICAL

Lens:	Adjustable 2.8mm, f1.4
Focus:	Fixed focus, wide angle (factory set)
Field of view:	Water, 94 deg. (H) x 73 deg. (V) x 115 deg. (D)
Depth of field	4" to infinity

2.4 ENVIRONMENTAL

Operating depth:	6000 meters (1.5X design factor)
Operating Temperature:	-20 deg. C to +40 deg. C
Storage Temperature:	-30 deg. C to +70 deg. C

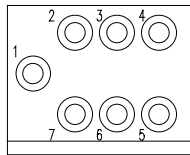
3.0 GENERAL

The Micro-SeaCam 1010 utilizes a black and white CCD video camera and a 2.8mm lens. The camera and lens are contained within a chassis that is integrated into the rear endcap. The Camera has been pressure tested to _____ psi and is shipped ready to use. Make proper connections per section 3.1 then, power up power supply and monitor to observe video picture on monitor from camera.

The camera is reverse voltage protected, accidental application of reverse polarity voltage will not damage the camera.

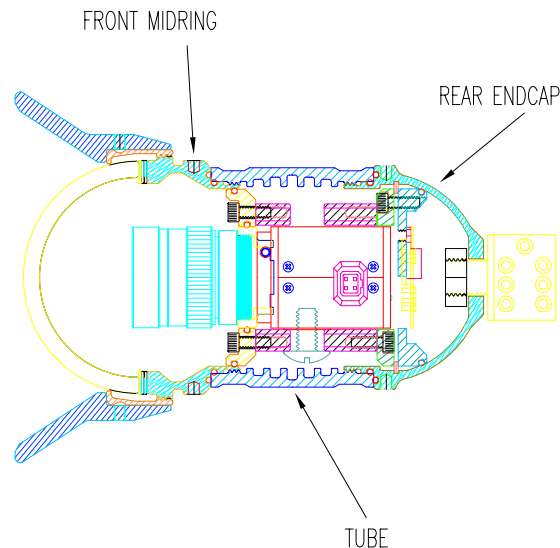
3.1 CABLE CONNECTIONS (TYPE _____ SHOWN)

PIN	
1	GND
2	+11 TO +30 VDC
3	NC
4	NC
5	VIDEO OUT
6	NC
7	NC



3.2 HOUSING DISASSEMBLY IRIS ADJUST

Using appropriate spanner and/or strap wrench loosen rear endcap by turning counter clockwise. Grasp housing tube when turning loose rear endcap. Do not hold or attempt to turn crash guard when removing or assembling housing. To better access dome for cleaning or inspection, loosen front mid-ring (front ring with spanner holes) by turning counter clockwise from housing tube. Do not remove front dome sealing cowl that crash guard mounts to.



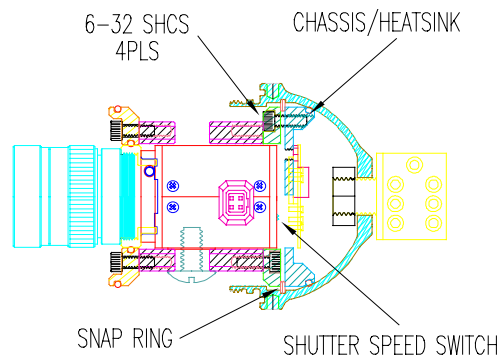
(LPBH7MP SHOWN)

Once the rear endcap camera assembly has been removed from housing tube, the lens iris can be adjusted. It is recommended that the iris adjustment ring be fixed in place with some tape after final adjustment.

3.3 CAMERA ORIENTATION CAMERA FUSE REPLACEMENT ELECTRONIC SHUTTER SWITCH ACCESS

After removal of rear endcap camera assembly, remove four 6-32 socket head cap screws at rear of CCD camera module. A 7/64" ball tip allen wrench is best for this procedure. Gently pull the camera chassis away from the rear endcap. Three small wires from CCD module to regulator fuse PCB must be pulled free from single pin sockets on regulator PCB. Single pin sockets are marked, +, -, V (video). Wires from CCD module are marked and color coded, VDC (red), GND (black), VID (white).

The camera chassis can be rotated in 90 degree increments in relation to chassis mount/heatsink bolt pattern. Camera chassis assembly and chassis mount/heatsink can be rotated **slightly** for final adjustment after assembly has been reassembled into rear endcap. Rotating camera chassis without removing camera chassis from chassis mount/heatsink can twist and cause wires to disconnect from their sockets.



(LEFT CONNECTOR ORIENTATION SHOWN)

Remove snap ring retaining bare aluminum chassis mount/heatsink plate inside rear of rear endcap. Use a small standard screwdriver to free snap ring. Once snapping has been removed the chassis mount/heatsink plate will pull free from endcap.

Wires from LPBH7MP bulkhead underwater connector are tagged with their corresponding bulkhead connector pin number inside housing. The single pin sockets on the regulator PCB have different numbers.

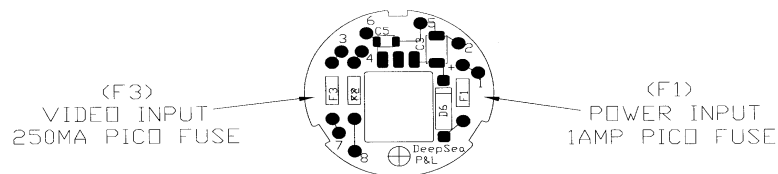
REGULATOR PCB SINGLE PIN SOCKETS

SOCKET #	FUNCTION
1	+VDC
2	GROUND
3	VIDEO IN

The fuses that protect the camera are located on the bulkhead connector side of the rear endcap on the regulator protection PCB. These “pico fuses” are easy removed and replaced by gently pulling them straight out from their single pin sockets with a small pair of needle nose pliers.

PICO FUSE SPECIFICATIONS

FUSE #	FUNCTION / VALUE
F1	POWER INPUT/ 1AMP
F3	VIDEO/ 250mA



(F2 IS NOT USED)

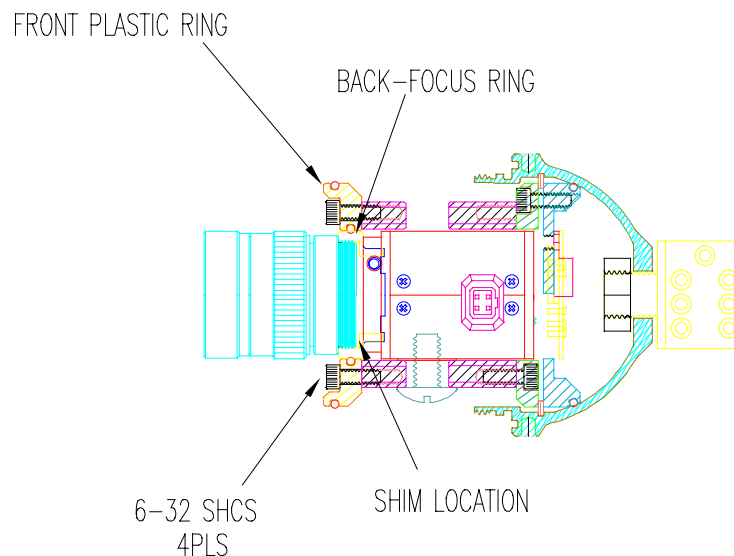
Access to rear of CCD module and the electronic shutter switch is possible after camera chassis has been removed from rear endcap. The electronic shutter functions by electronically controlling

the exposure time of the CCD image chip. As the level of light falling on the chip increases the exposure time is decreased, and vice versa. This allows the camera to adjust automatically to varying light conditions, similar to an auto iris lens.

When reassembling make sure that all sealing surfaces are clean and free of debris. Inspect and lubricate all orings regularly. Make sure that all housing parts are screwed together. It is highly recommended that the housing be purged with dry nitrogen, and the desiccant packs be replaced the moment before reassembling.

3.4 FOCUSING CAMERA

Follow housing disassembly instructions. unscrew camera lens from CCD module by loosening counter clockwise. Remove the four 6-32 socket head cap screws at front of CCD module next to lens (use 7/64" allen wrench). Remove front plastic ring from front of CCD module by slightly twisting and pulling. Loosen three tiny black set screws that retain back-focus ring and remove ring. Note Kapton spacer ring shims in CCD module lens mount. Add or remove shims to set focus to desired distance.



3.5

