

C600

Color Zoom Camera



OPERATION AND MAINTENANCE MANUAL



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WARRANTY

ROS, Inc. (hereinafter called "**ROS**") warrants its products as stated below subject to the conditions specified.

ROS warrants its products, when operated under normal conditions, to be free from defects in material or workmanship for a period of one year from the date of purchase provided that inspection by **ROS** discloses that such defects developed under normal and proper use. **ROS** products repaired or replaced pursuant to this warranty shall be warranted for the unexpired portion of the warranty applying to the original product. The liability of **ROS** under this warranty shall exist subject to the following conditions:

- (a) Purchaser properly notifies ROS of such defects and the defective product is returned to ROS, transportation charges paid by Purchaser.
- (b) ROS shall be released from all obligations under its warranty in the event repairs or modifications are made by persons not authorized by ROS.
- (c) Representations and warranties made by any person, including distributors and representatives of ROS, which are inconsistent or conflict with the terms of this warranty, shall not be binding upon ROS unless reduced to writing and approved by an officer of ROS. ROS shall in no event be liable for other direct, special, incidental, consequential, indirect or penal damages.
- (d) The laws of the State of California shall govern this warranty.

In the event the defect is determined to be within the terms of this warranty then **ROS** agrees to repair and/or replace (at **ROS**' discretion) the product or defective portion at no charge to the Purchaser. This warranty does not apply to expendable items or to normal wear-and-tear, and is conditional upon performance of normal preventative maintenance procedures.

Our commitment to quality and customer service directs us to constantly strive to improve our products. The materials and specifications presented in our manuals and data sheets are correct and accurate to the best of our knowledge, and are presented in good faith. However, the information is not guaranteed and is subject to change without notice.

LIMITATIONS OF REMEDIES

Purchaser assumes all risk and liability for results obtained in any installation, operation, or use of the product. Purchaser's sole remedy for any breach of warranty by vendor shall be limited to the "express remedies" set forth above. Otherwise, in no event shall vendor, its agents, or employees be liable to the original purchaser or any third party for any consequential or incidental damages or expenses of any nature arising directly out of or in connection with the use of vendor projects, even if vendor has been advised of the possibility of such damages or expenses. In any event, unless otherwise contrary to state law, vendor liability under this limited warranty shall not exceed the purchase price of the product.

CUSTOMER ASSISTANCE

ROS, Inc. uses a worldwide network of stocking distributors and representatives who are familiar with our products and are able to provide assistance during installation and/or operation of these products.

If you have any questions or problems with this product that are not covered by this manual or instruction, please contact our agent in your area, or contact us directly by phone or FAX or e-mail.

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CHANGE RECORD

<u>REV</u>	<u>DESCRIPTION</u>	<u>DATE</u>
A	PRODUCTION RELEASE (EC-02092)	17SEP14
B	SEE EC-02944	12OCT18
C	SEE EC-03559	20APR23
D	SEE EC-03604	22FEB24

1 WARNINGS AND CAUTIONS



CAUTION: Do not disassemble the unit other than to remove the end cap and main connector. There are no user-serviceable parts inside the camera.



CAUTION: Shut off power before connecting or disconnecting cables to the camera.



CAUTION: O-rings and o-ring sealing surfaces must be clean, lubricated and free of damage during installation.

2 DESCRIPTION

The Remote Ocean Systems C600 Color Zoom Camera outputs full 1080p HD color video in either digital 3G HD-SDI or analog Component. The C600 can also output standard definition video in NTSC and PAL formats. The C600 comes in a small form factor, extremely corrosion resistant, titanium package capable of withstanding pressures of up to 6000MSW (8820 psi). Camera function and configuration are controlled by serial connection. Users may choose Sony's free VISCA control software package or may write their own control software using the thoroughly-documented serial protocol. Table 1 lists the available configurations.

Table 1. Configuration Descriptions

Part number	Connector Option	HD Signal	Field Replaceable
52-51330-01	Seacon 5506-1508	Analog Y Pb Pr	Yes
52-51330-02	Impulse LPMBH-8-MP	Analog Y Pb Pr	Yes
52-51330-03, -07	Seacon MINL-5515-FCR	Digital 3G HD-SDI	No
52-51330-04	Burton 5507-1508-BCR	Analog Y Pb Pr	Yes
52-51330-05, -10	SubConn 75CXBH6MSS/TI	Digital 3G HD-SDI	No
52-51330-08	Seacon MCBH-8M	Analog Y Pb Pr	Yes
52-51330-06, -09	SubConn MCBH-8M	Analog Y Pb Pr	Yes
52-51330-11	SubConn HF75CXBH6MTI	Digital 3G HD-SDI	No

3 PRODUCT SPECIFICATIONS

Table 2 lists the C600 product specifications.

Table 2. Product Specifications

Performance	
Horizontal resolution	1920
Vertical resolution	1080
Minimum scene illumination	1.4 lux
Optical zoom	30x
Digital zoom	12x
Field of view in water	80° diagonal
Electrical	
Input voltage	12 – 36 VDC
Input power	7 W
Control	RS232 – Sony VISCA
Output SD	NTSC / PAL
Output analog HD	Y/Pb/Pr, 75 Ω, 1 V
Output digital HD	3G HD-SDI
Mechanical	
Housing material	Titanium 6Al-4V
View port material	Glass BK-7
Bezel material	Delrin
Length without connector	8.25 in (210 mm)
Diameter	3.5 in (89 mm)
Weight in air	4.9 lb (2.2 kg)
Weight in water	2.1 lb (1.0 kg)
Connector	Seacon 5506-1508 (standard, others available)
Environmental	
Operating depth	6000MSW (8820psi)
Operating temperature	-5° to 50° C
Storage temperature	-20° to 60° C

4 SETUP

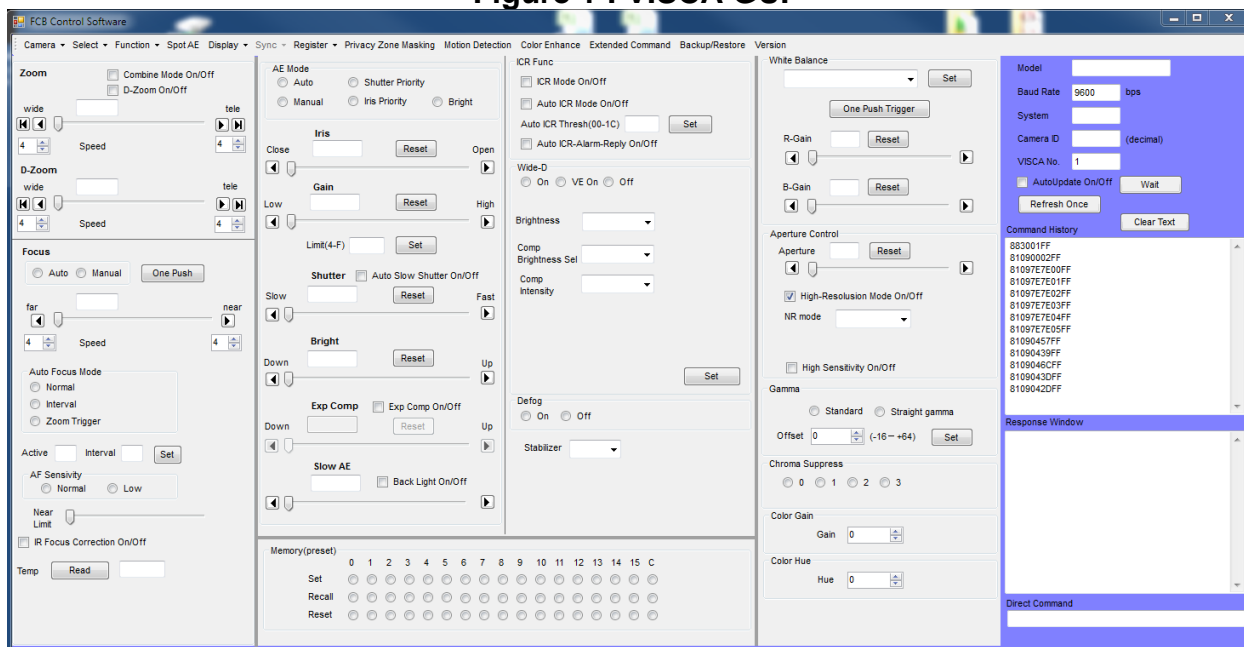
- a. Ensure all equipment is powered off.
- b. Ensure the intended power supply can supply between 12 V and 36 V and 7 W.
- c. Connect the camera cable to the main connector.
- d. Hand-tighten the locking sleeve.
- e. Connect the power, video (Y/Pb/Pr or 3G HD-SDI) and control (RS232) lines of the cable to the power supply, monitor and controller PC with Sony VISCA software installed.
- f. Ensure the power supply is set to between 10 V and 36 V.
- g. Switch the power supply on.
- h. Start the controller or Sony VISCA GUI software on PC.
- i. Verify correct functionality by adjusting the zoom setting and observing the result on the monitor.
- j. Refer to the Sony FCB-7500 documentation for camera options and setup.

5 OPERATION

The C600 camera has no on/off switch, and will output video whenever power is applied. To turn the camera off, switch off the power supply.

The user has complete control of all the camera block functions through the Sony VISCA GUI. It can be downloaded for free from the Pro Sony website or available from ROS (P/N 52-51351-4). The software is shown in Figure 1.

Figure 1 : VISCA GUI



6 MAINTENANCE

The C600 has no internal user-serviceable parts. The camera is purged with dry nitrogen to prevent fogging and protect the electronics. Disassembling the camera

beyond the procedures in this section will void the warranty and may damage the camera. Depending on the model, the main connector may be field replaceable (see Table 1).

6.1 Replace the main connector

Certain color camera main connectors may be replaced in the field when they become damaged. Consult Table 1 to determine whether your connector is field replaceable. Disassembly of or attempt to replace the connector of a unit not listed in Table 1 as field replaceable will void the warranty and will allow moisture into the camera electronics and optics. Proceed as follows to replace a damaged, field replaceable connector.



CAUTION: Do not disassemble the unit other than to remove the end cap and main connector. There are no user-serviceable parts inside the camera.



CAUTION: Shut off power before connecting or disconnecting cables to the camera

- a. Shut off the camera power supply.
- b. Disconnect the camera cable.
- c. Rinse the camera with fresh water to remove as much salt and other residue as possible.
- d. Dry the camera.
- e. Set the camera to stand on its bezel (Figure 2).

Figure 2 : Camera on Bezel



- f. Remove and save the two 4-40 socket cap screws attaching the end cap to the housing (Figure 3).

Figure 3 : Remove screws



- g. Insert two 4-40 x .625 long (or longer) screws into the jacking screw holes (Figure 4).

Figure 4 : Jacking screws



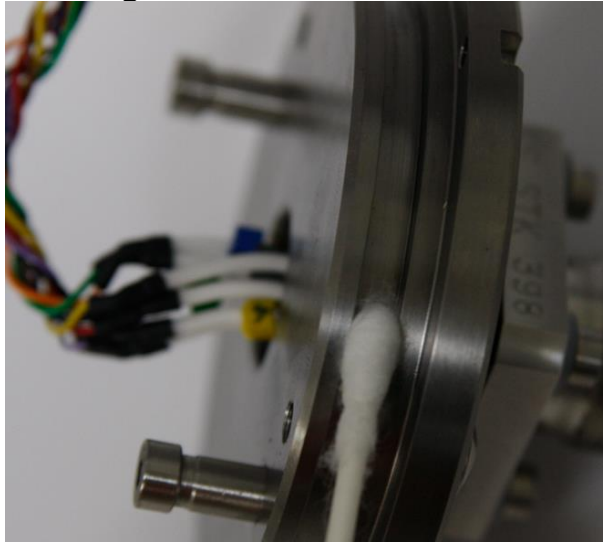
- h. Tighten the jacking screws to extract the end cap from the housing.
- i. Carefully remove the end cap from the housing and disconnect the wiring harness.



CAUTION: O-rings and o-ring sealing surfaces must be clean, lubricated and free of damage during installation.

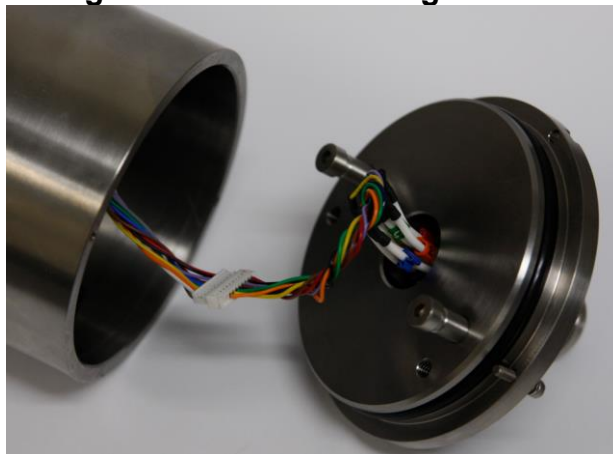
- j. Clean the o-ring sealing surface (Figure 5) of the housing to ensure a good seal.

Figure 5 : Clean seal surface



- k. Ensure the o-ring of the replacement end cap is clean and lubricate.
- l. Inspect the replacement o-ring, o-ring groove, and sealing surface of the housing for damage or foreign material.
- m. Connect the replacement end cap and connector assembly to the wiring harness (Figure 6).

Figure 6 : Connect wiring harness



- n. Set the replacement end cap assembly on the housing so that the o-ring rests on the lip of the housing.
- o. Using both hands, press the end cap evenly into the housing.

NOTE: External screws are titanium. Do not replace with screws of other material. Steel, stainless steel, or other materials will corrode rapidly in the camera assembly when exposed to water.

- p. Replace the attaching screws and torque to between 3.5 lb-in and 4.7 lb-in.

7 TROUBLESHOOTING

This section provides information on troubleshooting the C600 color camera.

Failure modes, causes, and corrective action are listed in Table 3. User repairs are limited to replacing the connector (in certain cases) and ensuring cables, displays, power supplies etc. are set up and functioning correctly. In the event the following steps do not uncover a user correctable problem, contact ROS for assistance.



CAUTION: Shut off power before connecting or disconnecting cables to the camera.

Prior to performing any fault isolation procedure, inspect the camera for visible damage. This may include denting, discoloration, corrosion, or flooding. Inspect all connectors to verify pins are straight and undamaged.

Table 3. Troubleshooting

Problem	Typical cause	Verification	Corrective action
No image	No power, reversed power, incorrect power	Verify between 12 V and 36 V is connected between pin 1 (+) and pin 2 (-). Verify the power source can supply at least 7 W.	Connect to appropriate working power supply.
	Failed video display	Connect the display to another video source.	Replace the display
	Damaged cable or connector	Swap in known good cable	Replace the cable.
	Seal failure	Unit contains water.	Contact ROS
	Camera failure	Unit draws no current when voltage is applied.	Contact ROS
Flickering or garbled image	Video format (SD)	Verify the camera is set to output the same format (NTSC or PAL) that the display accepts.	Set the camera to the correct output format
	Sync problem (HD)	Verify the HD cables are securely connected, appropriate length, undamaged, and well-constructed. Poor test cables may cause noise and sync issues.	Connect with higher quality cables
	Damaged cable or connector	Swap in known good cable	Replace the cable.
Blurry image	Video display (SD)	Verify the display has a minimum of 500 TV lines.	Connect to higher quality display

	Moisture in the camera	Moisture or fogging visible through port	Contact ROS.
Noisy image	Loose connection	Verify all cables are securely connected.	Connect cables securely
	Damaged cable or connector	Swap in known good cable	Replace the cable.
Can not open Sony GUI	Loose connection	Verify all cables are securely connected.	Connect cables securely
	Comm Port	"No camera respond" window when opening GUI software	Locate the connected port using Windows Device Manager

NOTE: Subconn connectors are dry mate only, and cannot take open face pressure. Locking sleeves are required. No greasing in the actual coax part.