CA2093 / SA2093

Auto Exposure Camera

Instruction Manual

Model CA2093 / SA2093

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Contents

Features

- Automatically selects the correct exposure by adjusting shutter speed or gain
- Digital Auto Shutter speeds from 1/60 sec. to 1/125,000 sec.
- Digital Auto Gain Control 0db - +16db
- 10 manual shutter speeds including: 1/100 (FL), 1/125, 1/250, 1/500, 1/1000, 1/2000, 1/4000, 1/8000, 1/10000, 1/15000 plus OFF and AUTO
- All controls on Camera Control Unit (CCU) for easy access (Shutter Control, Auto Exposure Lock, Peak / Average detection, White Balance and Power)
- Provides RGB, Sync, S-Video (YC), NTSC Video and B&W signals simultaneously
- High Resolution, Low Noise ½" Hyper HAD™, Color CCD Image Sensor
- Small size camera head
- MicroImage Support

Unpacking Instructions

The MicroImage CA2093/SA2093 Camera for RGB, S-Video (YC), NTSC and B&W consists of:

MicroImage A209 Auto Exposure Camera
MicroImage CCU209 Camera Control Unit
Camera (to Power Supply) cable(s)
4 - 6 foot BNC to BNC cable or 1- 9 pin to BNC cable
Detachable 3 wire power cord
This Instruction Manual

See the Optional Items for use with this camera section for other MicroImage products that may enhance video operations.

Unpack all items carefully. Check each item against contents list above.

Inspect Unit to make sure that there is not any shipping damage. If there was shipping damage, Call MicroImage Video Systems Immediately. Do NOT plug unit in to power if damaged. Further destruction and/or injury may result.

Installations

Connect Unit as specified in the ***Connections*** section of this manual.

Plug power cord into POWER connector on rear of unit.

Plug power cord into 120 VAC 60Hz AC power.

Turn on power by moving the POWER switch up. Green power lamp should become illuminated. If the power indicator does not come on, see the In Case of Difficulty section of this manual.

Connections

Connect the small 15 pin HD end of the camera cable to the camera module. Connect the large 15 pin end of the cable to the Camera Control Unit (CCU). Screws are provided to firmly secure the cables. Do not connect camera cable while CCU is on.

The MicroImage Model CA2093/SA2093 Camera generates RGBS, YC (S-Video), NTSC Video, and Black & White video. All signals from the CCU may be connected at the same time without any signal degradation.

RGB

Connect the 9 pin sub mini D connector to the similar connector on the CCU. Connect the Red, Green, Blue and Sync BNC connectors to monitor or printer. If only one RGB monitor is being used, place the RGB and SYNC TERM switches in the TERM or 75 Ù position.

If a second monitor is being used, please consult the monitor manual for proper looping and termination procedures. Not all monitors terminate the same way. Some monitors do not have looping capability, in this case a Video Distribution Amplifier will be required. An improperly terminated monitor will result in a degraded picture.

NTSC

Connect a BNC cable from the NTSC connector on the CCU to the VIDEO IN connector on the monitor. If this is the only monitor being used, place the TERM switch in the TERM or 75 Ù position.

If a second monitor is being used, please consult the monitor manual for proper looping and termination procedures. Not all monitors terminate the same way. Some monitors do not have looping capability, in this case a Video Distribution Amplifier will be required. An improperly terminated monitor will result in a degraded picture.

Black & White

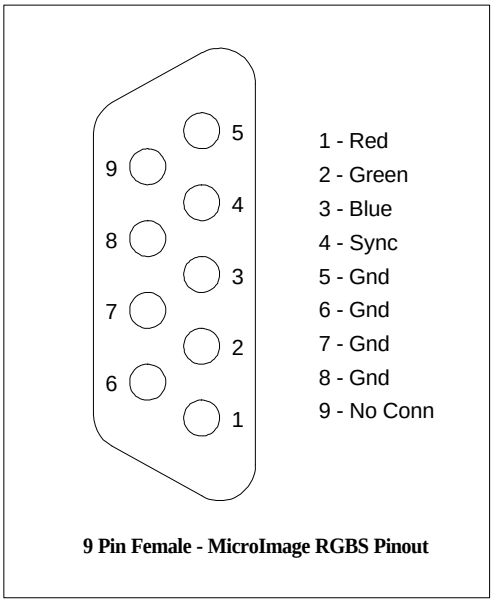
Connections are the same as for NTSC above except connect to the B/W output of the CCU instead.

S-Video (YC)

Connect a YC (4 pin to 4 pin) cable from the YC connector on the CCU to the YC IN (S-Video) Connector on the monitor. If only one YC monitor is being used, place the YC TERM switch in the TERM or 75 Ù position.

If a second monitor is being used, please consult the monitor manual for proper looping and termination procedures. Not all monitors terminate the same way. Some monitors do not have looping capability, in this case a Video Distribution Amplifier will be required. An improperly terminated monitor will result in a degraded picture.

Connector Wiring Diagrams



9 Pin Female - MicroImage RGBS Pinout

Auto Exposure Operation

This camera incorporates MicroImage Video Systems 3rd generation Auto Exposure system. The new system provides very smooth auto shutter operation while maintaining a fast response time. Digital gain control has been added for improved AGC functionality and to eliminate negative interactions with the shutter system that are common to conventional AGC controls. Both Peak and Average detection were added to allow exposure flexibility in more situations. Other changes include improved communications for use with Computer control and with future MicroImage products, lower power consumption and improved White Balance.

Many operations can cause a change in light level to the video camera, the most common of which is changing the magnification of the optics. The change in light level usually results in loss of a usable picture. The Auto exposure in the CA2093/SA2093 automatically changes the shutter speed or gain after a light level change is detected. The system is designed to provide a fast response to light changes. When the camera determines that picture quality will be compromised, it will change to a new exposure.

Camera Controls

The Camera Control Unit provides remote control of many of the camera functions. The controls also allow the camera to operate as a full AutomatiCam.

Power

Power is turned on or off with the power switch located on the right side of the unit. A green light inside the switch indicates when power is on.

White Balance

This rotary switch selects the white balance mode. The choices include ATW (Auto), Halogen, Xenon, 3200K and 5600K. Normally the ATW mode will provide the best white balance.

Peak/Average

The peak / average detection switch selects how the light from the image sensor affects auto shutter and digital gain operation. Peak detection senses bright spots and adjusts the auto shutter and digital gain to correctly expose the bright areas. Most situations with compound microscopes work well with Peak mode. Average mode senses the overall picture contrast, so the auto shutter and digital gain do not respond to pinpoint or bright spots of light. Most stereo or surgical scopes work best in this mode. There are exceptions in both cases, however, and you may need to try both to find the best mode. Once it is determined which mode works best for your application, set it and the camera responds automatically to the lighting situation.

On systems with a CCU or PS1SD, the Peak / Average switch is located on the front panel.

Shutter

The shutter control provides 10 manual shutter speeds, exposure and shutter off positions. When the shutter is placed in the auto position, the camera will automatically adjust the shutter or gain to compensate for changing light levels (see Auto lock below). When the shutter is set to Auto, the light in the Auto Lock switch will be illuminated green.

Auto Lock

The Auto Lock holds the camera at the current exposure setting, not allowing any further updates (red light on). The shutter or gain will remain stable until the lock switch is turned off (green light). This feature eliminates gain float or shutter adjustment to aid in accurate readings for image analysis work.

AGC on/off

The Auto Lock generally eliminates the need to turn off the Auto Gain Control. However, in the event that the AGC needs to be turned off, there is an internal control available on the CCU. Unplug the unit, then remove the four screws that fix the top to the bottom of the CCU. Slide the top toward the rear of the unit one half inch. On the top of the control panel circuit board there is a dip switch pad. Switch number three is AGC on/off. The CCU is shipped with AGC on, move the switch to the "off" position and the AGC will be disabled.

WARNING HIGH VOLTAGE - Use extreme caution when opening unit. Unplug from 120 VAC power source. Failure to follow this warning can result in lethal shock.

Edge Enhancement

The Edge Enhancement feature is an internal control on the CCU. Edge Enhancement is used to increase the amount of detail to improve image definition. Too much enhancement can, however, interfere with some frame grabbers or video printers.

There are 3 levels of enhancement available on a dip switch pad on the top of the main board in the CCU. Unplug the unit, then remove the four screws that fix the top to the bottom of the CCU. Slide the top toward the rear of the unit until the two switch dip pads are visible. You will see one on the top of the control panel board, but that is for AGC control. The units are shipped from the factory with switch number one in the on position. This is the first level of enhancement. To remove all enhancement, turn number one off. To increase enhancement to level two, turn number one off, and turn on number two. For the third level turn both switches on.

When you find the level of enhancement that suits your application, replace the top. The most common level of

enhancement used is as the units are shipped (level one).

WARNING HIGH VOLTAGE - Use extreme caution when opening unit. Unplug from 120 VAC power source. Failure to follow this warning can result in lethal shock.

VCR Connections

The NTSC and YC signals may be recorded on videotape. High resolution VCRs such as the S-VHS type will give much higher quality recordings than standard VCRs. Use of the YC signal with these VCRs will provide the highest resolution. The combination of RGB for real time and YC for recording is the optimum way to obtain the best picture quality.

NTSC

Connect a cable from the NTSC connector of the CCU to the VIDEO IN connector on the VCR. Note that adapters or special cables may be required.

Connect a cable from the VIDEO OUT connector of the VCR to the Video or NTSC INPUT connector of an NTSC monitor as described in the VCR instruction manual.

DO NOT connect the above signals to the Antenna or ANT connectors on the VCR.

S-Video (YC)

Connect a YC (S-Video) cable from the YC connector on the CCU to the S-Video INPUT connector on the VCR. Note that a VCR with YC capability such as an S-VHS VCR must be used.

Connect a YC (S-Video) cable from the S-Video OUTPUT connector on the VCR to the YC or S-Video INPUT connector on a YC monitor as described in the VCR instruction manual.

If the VCR has a switch to select NTSC(Video) or S-Video, place the switch in the S-Video position. See the VCR operation manual for more information.

VCR Operation

For normal use, the Camera and the VCR may be left connected. However, both the Camera and the VCR (along with any other connected equipment) must have their power turned on in order to see a proper camera image on the video monitor. If the VCR is connected properly, it should pass the camera image just like if the VCR was not connected while stopped. If PLAY is pressed on the VCR, then of course you should see the video tape picture instead of the current camera image.

The exact procedure for recording and playing tapes on a VCR varies between different models. It is impossible to describe all the methods here. Please refer to your VCR operation manual BEFORE calling MicroImage Video Systems. If calling MicroImage Video Systems for assistance on VCR connection problems, please have the VCR

operation manual handy. Manuals for other equipment are also good to have at hand. Not all VCR related problems are the VCR.

Precautions

Use extreme caution when opening unit. LETHAL VOLTAGES are present inside. Unplug from 120V AC power source. Refer servicing to authorized personnel.

DO NOT connect main unit to any other camera module. The signals are proprietary to this system and may result in damage to both units

DO NOT allow water or moisture to enter unit. Injury and/or damage may result.

DO NOT stress cable or bend tightly at connectors. DO NOT pull cable by connectors. Avoid twisting the cable near connectors.

Connect unit only to 110-125 VAC 50/60Hz.

Clean with only a mild cleaner. Strong cleaners may damage the finish. When cleaning, dampen a soft cloth and then wipe unit. NEVER spray cleaner directly into any electronic product. Severe damage and/or a lethal or severe shock may result!

Please put all manuals for this system in a safe place where they are easily found if needed.

In case of difficulty

1 - No Picture:

1) Check all connections, make sure power is connected and unit is turned on. Power light should be illuminated. If power lamp does not come on and power is applied, call MicroImage Video Systems for assistance.

2) If other equipment is installed between camera and monitor, check the camera and monitor for proper operation by connecting camera directly to monitor.

3) Check position of beam splitter on microscope.

2 -Camera Picture on screen but switches on CCU have no effect:

1) Turn unit off for 30 seconds and then back on to reset both CCU and Camera.

2) If the above does not solve the problem, contact MicroImage Video Systems for assistance.

3 - Picture appears bright and washed out:

1) Check monitor BRIGHTNESS control.

2) Check position of Peak/Average switch.

4 - Picture appears dark:

1) There may not be enough light reaching the camera. Check position of beam splitter on microscope.

2) There may be a bright spot (such as a reflection) causing the Auto Exposure to compensate. Note that the camera will sense a bright spot even at the very edge or beyond the edge of the monitor. Check Peak/Average detection switch.

5 - Color appears different between RGB and YC or NTSC:

1) MicroImage Video Systems uses a precision color matrix to derive colors. The matrix system used in monitors for NTSC and YC decoding may not quite match that of the cameras matrix. This is a problem with all camera and monitor combinations regardless of manufacturer and only becomes evident when RGB is compared to encoded color signals such as NTSC or YC.

2) Adjust the Hue and Color controls on the monitor to match NTSC or YC to RGB.

3) Have a service tech perform a "White Balance" on the monitor.

Note that steps 2 and 3 may not solve the problem due to the limitations listed in step 1

Technical Assistance

For Technical Assistance Contact:

WORLD VIDEO SALES CO., INC.
P.O. Box 331
Boyertown, PA 19512
Attention: Customer Service
Phone: (610) 754-6800

Output Levels:	
RGB	0.714 Vpp, 75 Ù
SYNC	0.5 Vpp, 75 Ù
NTSC	1.0 Vpp Composite, 75 Ù
YC	1.0 Vpp (Y),0.286 Vpp burst (C), 75 Ù
Monochrome	1.0 Vpp, 75 Ù
Connectors:	
NTSC / B&W	BNC Female
RGBS (CCU209)	9 pin D-sub female
YC	4 pin mini-DIN Female (Std. S-Video conn.)
Camera conn on CCU	15 pin sub mini D type
Connector on camera	15 pin HD sub mini D type
Horizontal Resolution	520 lines RGB, 470 lines YC/NTSC/B&W
Image Sensor	½" HyperHAD™ CCD, 768 (H) x 494 (V) pixels
Scanning System	2:1 interlace RS-170
Scanning Frequency	15.734 Khz (H), 59.94 Hz (V)
Chroma Frequency	3.579545 MHz
Sync System	Internal
RGB System	MicroImage High Res Matrix RGB
CCU to camera communication	EIA-D, 4800 baud 7E1 MicroImage Camera Control Format (CCF)
Auto Exposure System	Microprocessor based digital system
Auto Exposure Response Time	0.35 sec. max response (fast mode - A)
Auto Shutter Range	1/60 - 1/125,000 sec.
Auto Gain	0 to +16dB typ.
White Balance	Auto: 2800°K to 6200°K
S/N Ratio	50 dB
Minimum Illumination	0.3 lux on image sensor surface (gain on)
Lens Mount	C-Mount
Camera Power Requirements	12 VDC +/- 10%, 440 mA typ.
Operating Range	-10° ~ +50° C, 95% RH max.
CCU Power:	
Voltage	110 ~ 125 VAC 50/60 Hz
Consumption	25W max.
Dimensions:	
power supply	62 (H) x 179 (W) x 174 (D) mm 2.44 (H) x 7.03 (W) x 6.81 (D)
camera	43 (H) x 50 (W) x 130 (L) mm 1.7 (H) x 2.0 (W) x 5.125 (L) inches
Weight:	
power supply	3lbs. 12oz.
camera	12.4 oz.

HyperHAD™ is trademark of Sony Corporation.

MicroImage Video Pointers

MicroImage Timer /Titlers

MicroImage Split Screen Controllers & Video Faders

MicroImage Fixed Pattern Generators

MicroImage CrossLine Generators

MicroImage Video Distribution Amplifiers (VDA)

MicroImage Video Passive Switch Boxes

Cables

CAB11001*	1 ft BNC to BNC Cable
CAB11003	3 ft BNC to BNC Cable
CAB11006	6 ft BNC to BNC Cable
CAB11012	12 ft BNC to BNC Cable
CAB11025	25 ft BNC to BNC Cable
CAB11050	50 ft BNC to BNC Cable

* Above cables available in RED, GREEN, BLUE and BLACK

CAB12006	6 ft S-Video (YC) Cable
CAB12012	12 ft S-Video (YC) Cable
CAB12020	20 ft S-Video (YC) Cable
CAB12030	30 ft S-Video (YC) Cable

CAB13003	3 ft RGBS cable sets
CAB13006	6 ft RGBS cable sets
CAB13012	12 ft RGBS cable sets
CAB13020	20 ft RGBS cable sets

Other length camera cables also available. Contact MicroImage Video Systems for availability.

MicroImage Video Systems offers many more cables than listed above including longer versions. Please contact MicroImage Video Systems to check availability of cables not listed.

All above items may be ordered from your MicroImage Video Systems dealer.

World Video Sales Co., Inc. warrants that each MicroImage CA2093/SA2093 Camera System is free of defects due to faulty materials or improper workmanship. World Video Sales Co., Inc. further warrants that any part which proves defective in materials or workmanship within one year , will be replaced or repaired at no cost to the user. Labor to replace defective parts will be done without charge, provided the equipment is returned to World Video Sales Co., Inc. prepaid, insured and properly packaged. Prior return authorization must be obtained from World Video Sales Co., Inc.

Note

This warranty covers the MicroImage CA2093/SA2093 Camera System only.

Conditions

This warranty is void if the warranted part has been altered or subjected to abuse or misuse. Defective parts must be returned to World Video Sales Co., Inc.

Sole Warranty

This Warranty is in lieu of all other warranties expressed or implied including, without limitation, any implied warranty or any implied warranty of fitness for a particular purpose. World Video Sales Co., Inc. shall have the final right to determination as to the existence and cause of any defect and its appropriate adjustment in accordance with the terms of this warranty. In no event shall World Video Sales Co., Inc. be liable for any consequential or collateral damages.

Please call for a RMA Number on all repairs.

WORLD VIDEO SALES CO., INC.
625 Hoffmansville Road, Suite 3
Bechtelsville, PA 19505
Attention: <RMA #>
Phone: (610) 754-6800

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