INCAM
Full HD Micro camera
IVHD-1000

Operation Manual

11st Edition(Revised 1)

Welcome

Thanks for your selecting Incam IVHD-1000 Micro camera; we will provide the reliable product and service for you.

Please read the instructions carefully before using the product and keep it in safe.

Important safety warning as below:

To reduce the risk of fire or electric shock, do not expose this apparatus to rain or moisture.

To avoid electrical shock, do not open the cabinet. Refer servicing to qualified personnel only.

Power supply must be firmly grounded. And :

1. The device can be disconnected from the power supply by pulling the plug quickly and easily.
2. Never insert or disconnect the camera control cable of the camera if the camera/fiber unit is connected to a power source! This could damage the system!
3. Do not use this device near water, in humid or damp rooms. Do not expose the device to direct sunlight, dust.
4. Do not install or place the device near a source of heat such as: radiators, power-amplifiers or any other heat-producing equipment.
5. Since IVHD-1000 is a highly-dense camera module, appropriate heat dissipation shall be considered. We recommend using a metal base or others to install the camera.
6. Mobile phone or Walkie-talkie maybe will cause the device failure. It is recommended that the portable communications devices near be powered off.
7. Your warranty will be voided if you tamper with the internal components.

Table of Contents

1. Overview

Beijing Insight Visual Technology Co., Ltd. (abbr. IV-Tech) delivers Incam product and service for broadcast and the film industry. Incam product deliver unique live production experiences for effective, high-quality media work. Incam product including new camera tracking system, remote heads, micro camera, universal wireless camera control System, optical transmission product, customer-made product etc. With our professional technical team, we also provide the rental solution service, system design services, Image control technology training, professional after-sales services and customized services.

IV-Tech developed the impressive micro camera IVHD-1000 to meet the daily live production requirement.

2. Product Outline

Basic info: micro camera with tradition operation style

- ☐ Single Sony CMOS , compact size offer the outstanding picture quality, mobility and flexibility
- ☐ Experience the familiar workflow with the various accessories
- ☐ Sports event, E-sports, reality show, internet live, special POV, medical imaging application
- ☐ Future-proof, from HD to 4K, Incam micro 4K camera is available.

Features:

- ☐ Compact size, less than a normal business name card
- ☐ Sony Global shutter CMOS, adjustable back focus
- ☐ 1080P Full HD, 1920x1080, multi-format including 50/60p, 50/60i, 3G/HD-SDI interface
- ☐ Successful signal processing algorithms, excellent picture quality
- ☐ Various parameter for precise adjustment: color multiple correct processes, noise reduction, Lens Iris/focus, pixel correction, master pedestal, pedestal(R,G,B), Auto/Manual white balance, Auto Shutter/Gain, multi preset of camera setting
- ☐ Integrated traditional camera workflow: SMPTE fiber transmission, OCP control the parameter of the camera and lens, wireless for the video and control, gen-lock capability

System Application:
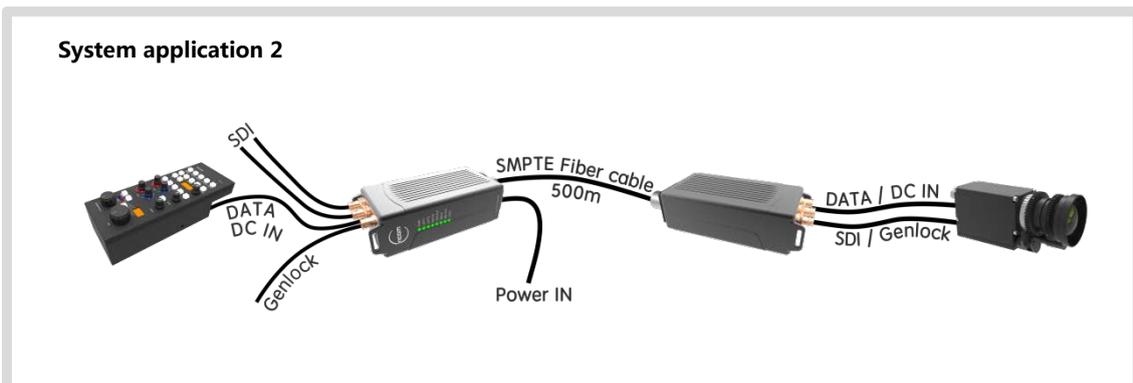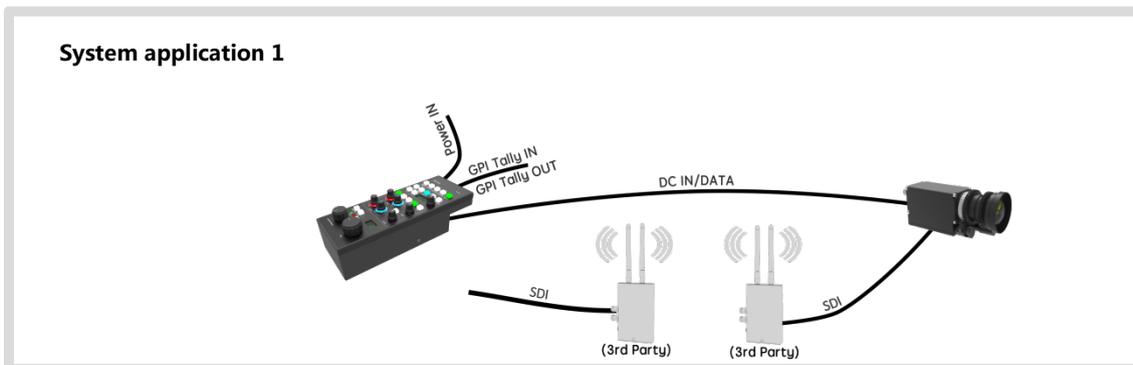
System application 3

System application 4

System application 5

System concept diagram

6 channel of HD camera
1 operator
1 fiber

**OCP-10
Camera selection
control panel**
Select the one camera from 6 cameras

IVHD-1000 **Micro camera**	**SE200T** **Fiber unit (Far end)**	**SE210R** **Fiber unit (Near end)**	**OCP-20** **Camera control panel**
HD @50/60i, 50/50P including Wide angle lens, Lens drive kit	6 x 3G/HD/SD-SDI 6 x camera control signal	6 x 3G/HD/SD-SDI 1 x camera control signal GPI signal to specify the camera	Picture parameter Lens parameter Scene save

3. Delivery items

    3.1 Standard scope of delivery Items

1	IVHD-1000 Camera module with lens and lens control kit.	

3.2 Option Items

1	LM3NCM Lens Other lens	
2	OCP-20 camera operational control panel (control the main parameter for TV program production)	
3	CC-B camera control cable including power and control signal, from the camera to the OCP or to the fiber unit, 20meters	

4	SE200 Multi channel fiber unit	
5	FPT-48 Field portable fiber transmission unit	
6	Wireless camera control transmission unit	
7	Other micro camera: 4K camera IV4K-4000	

4. Specifications

4.1. General Specifications of IVHD-1000

(1) Pickup Device	Device Type	1/1.8 type CMOS sensor (color)
	Effective Pixel Numbers	2064(H) × 1544(V)
	Unit Cell Size	3.45µm(H) ×3.45µm(V)
	Chip Size	7.121mm(H) × 5.327mm(V) (entire pixels area)
		6.624mm(H) x 3.726mm (V) (video output area)
(2) Resolution	1080p,1080i :	1920(H) × 1080(V)
	720p :	1280(H) × 720(V)
(3) Aspect Ratio	16 : 9	
(4) Video output format	1920 x 1080p @60fps(Level A) 3G-SDI	
	1920 x 1080p @60fps(Level B) 3G-SDI	
	1920 x 1080p @59.94fps(Level A) 3G-SDI	
	1920 x 1080p @59.94fps(Level B) 3G-SDI	
	1920 x 1080p @50fps(Level A) 3G-SDI	
	1920 x 1080p @50fps(Level B) 3G-SDI	
	1920 x 1080i @60fps HD-SDI	
	1920 x 1080i @59.94fps HD-SDI	
	1920 x 1080i @50fps HD-SDI	
	1920 x 1080p @30fps HD-SDI	
	1920 x 1080p @29.97fps HD-SDI	
	1920 x 1080p @25fps HD-SDI	
	1920 x 1080p @24fps HD-SDI	
	1920 x 1080p @23.97fps HD-SDI	
	1280 x 720p @60fps HD-SDI	
	1280 x 720p @59.94fps HD-SDI	
	1280 x 720p @50fps HD-SDI	
(5) Sync Systems	Internal / External Sync.	
(6) Video output standard	3G-SDI/HD-SDI : Y/Pb/Pr(4:2:2 10bit) BNC 75Ω terminal	
(7) Sensitivity	F5.6 2000lx	
(8) Minimum illumination	F1.4 3.5lx	
	Conditions : VIDEO 50%, AGC 30dB, Electric shutter OFF	
(9) Power requirement	DC+9〜+15V	
(10) Power consumption (typ.)	4W at DC+12V IN	
(11) Dimensions	Refer to overall dimension drawing	
(12) Weight	Approx. 212g	
(13) Lens mount	C lens mount	
(14) Gain setting	AGC (Maximum gain : 0dB〜48dB) MANUAL : 0dB〜48dB	※Noises may be noticeable at high gain.
(15) Shutter speed variable range	MANUAL:1/3600s ~ 1/25s *Shutter speed slower than 1/60s will be limited by the frame rate corresponding to the video output format.	
	AUTO: 1/3600s ~ 1/25s (Upper limit and lower limit can be set.) *Same as MANUAL, shutter speed slower than 1/60s will be limited by the frame rate corresponding to the video output format.	
(16) White balance adjustment range	AUTO, AUTO (Outdoor), ATW, 7 different Preset, MANUAL, User Preset 1~5, and One Push	
	Preset: Daylight(5500K),Cloudy(6500K),Shade(8000K),Tungsten(3200K),Fluorescent(White), Fluorescent(Neutral White), Fluorescent(Daylight)	

(17) Auto Exposure Detection	Average/Center-Weighted/Spot/Backlight Compensation
(18) Flicker cancellation	ON, OFF(typ.) ＊Valid at 60fps,59.94fps,30fps,and 29.97fps.
(19) Edge Enhancement	OFF,1～7 (typ.2)
(20) Color Correction	Standard, Fluorescent Light, Tungsten Lamp
(21) Color Saturation Adjustment	0% (B/W)～100% (typ.)～200%
(22) Color Compression	OFF, 1～7(typ.5)
(23) Noise Reduction	ON,OFF
(24) Contrast/D Range	Contrast-2, Contrast-1,Standard, Contrast+1, Contrast+2, D-range Extension
(25) Master Pedestal	-100 ～ 0 ～ +100
(26) Pedestal (R, G, B)	RGB: -100 ～ 0(typ.) ～ +100 each
(27) Color Balance	RGB: 50 ～ 100(typ.) ～ 150 each
(28) Pixel Defect (White spot) Correction	Corrected at factory setting.
(29) Preset (Camera settings)	1, 2, 3, and 4 (4 presets can be set.)
(30) DC Iris Output(Not supported as of today)	Auto/Open selectable. Can be used with electric shutter. (Electric shutter has priority.)
(31) Remote Control Operation	The camera can be controlled via RS-422 communications with DATA connector. With connecting the optional camera operational control panel, camera settings can be set on OSD (On Screen Display).
(32) Durability	Vibration　Acceleration　　　: 98m/s^2 (10G)　　　　　　　　Frequency　　　　　: 20～200 Hz　　　　　　　　Direction　　　　　: X,Y, and Z, 3 directions　　　　　　　　Testing time　　　　: 120min for each direction
	Shock　　　　No malfunction shall be occurred with 980m/s^2(100G) for ±X,±Y, and ±Z, 6 directions.
(33) Operation environment	Performance Guaranteed　0~+40℃　Humidity 20 ~ 80%RH　　　with no condensation
	Operation guaranteed　5 ～ +45℃　Humidity 20 ~ 80%RH　　　with no condensation
	※Performance guaranteed: All the specifications specified in this manual is guaranteed under performance guaranteed temperature. ※Operation guaranteed: All the camera functions operate normally under operation guaranteed temperature.
(34) Storage Environment	Storage Temperature: -25 ～ +60℃, Humidity: 20 ～ 80%RH with no condensation.

<3G-SDI output Level A and Level B>

The difference between Level A and Level B is a way of mapping Y signal and Cb/Cr signal onto 3G-SDI standard signal. The difference does not affect the resolution of the video signal. Some 3G-SDI receivers correspond to either Level A or B, whereas other receivers correspond to both Levels, so please set the camera mode to match your 3G-SDI receiver.

4.2   Specifications of option lens Kowa LM3NCM

Focal Length	3.5mm
Lens Type	Fixed Focal Length
Image Size	1/1.8" (7.2 x 5.4 x 9mm)
Iris Range (F-Stop)	F2.4 - 14
Angle of View 1/1.8" (Hor. x Ver. x Dia.)	89.0 x 73.8 x 101.7°
TV Distortion	0.40%
Minimum Object Focus Distance (1/1.8") (Hor. x Ver. x Dia.)	226.3 x 171.4 x 282.4mm
Focusing Range	0.1m
Flange Back	17.526mm in air
Back Focus	9.7mm in air
Filter Thread Size	M40.5x0.5
Front/Rear Effective Diameter	Front Φ28.0mm / Rear Φ10.0mm
Mount	C-mount
Exit Pupil Location	-67.5mm
Temperature Range	-10°C ~ +45°C
Storage Temperature Range	-20°C ~ +60°C
Weight	85g

5. Part Names and Functions

No.	Name	Function
1	Iris servo unit	Iris motor control of lens, length adjustable to support different lens.
2	Focus servo unit	Focus motor control of lens, length adjustable to support different lens.
3	Lock ring	Tight the ring to lock the lens well.
4	Lens mount	C-type lens mount.
5	Mounting hole	Any custom specific mounting can be done with the mount hole, like as the tripod.
6	Screw for the Lens servo unit	Two screws for Iris/focus servo unit, M3 x8.
7	DATA connector	Connector for camera power input, camera control, gen-lock in
8	Video connector	Connector for 3G-HD SDI Video output

6. Pin assignments of DATA connector

Pin No.	Assignment
1	Signal GND
2	422 RXD +
3	422 RXD -
4	422 TXD -
5	422 TXD +
6	SYNC IN
7	Power GND
8	Power DC in, 12V

7. Gen-Lock

Input analog external sync signals (black burst or 3-value SYNC) to the EXT SYNC IN terminal of 6pins connector to enable Gen Lock function.

The external sync signals to be supplied shall depend on its video output format, therefore, please refer to the chart below and input appropriate signals.

CAMERA FORMAT		EXT SYNC IN				
	1080p60A			1080i60	720p60	1080p30
	1080p59.9A	NTSC		1080i59.9	720p59.9	1080p29.9
	1080p50A		PAL	1080i50	720p50	1080p25
	1080p60B			1080i60	720p60	1080p30
	1080p59.9B	NTSC		1080i59.9	720p59.9	1080p29.9
	1080p50B		PAL	1080i50	720p50	1080p25
	1080i60			1080i60	720p60	1080p30
	1080i59.94	NTSC		1080i59.9	720p59.9	1080p29.9
	1080i50		PAL	1080i50	720p50	1080p25
	1080p30			1080i60	720p60	1080p30
	1080p29.9	NTSC		1080i59.9	720p59.9	1080p29.9
	1080p25		PAL	1080i50	720p50	1080p25
	1080p24					1080p24
	1080p23					1080p23.9
	720p60			1080i60	720p60	1080p30
	720p59.9	NTSC		1080i59.9	720p59.9	1080p29.9
	720p50		PAL	1080i50	720p50	1080p25

- Input Black Burst signals for NTSC/PAL signal.
- Input 3-value SYNC signals for other than NTSC/PAL signal.
- EXT SYNC IN is terminated with 75Ω. (It becomes high impedance when camera power is OFF).
- When the external signals specified above are input, the camera becomes external sync mode automatically.
- When no external signal is input, the camera operates in internal sync mode.
- The image may be disturbed right after the external signal is input, but this is not malfunction.
- When a signal other than specified above combination is input to the EXT SYNC IN terminal, the image might be disturbed or no image might be output.

8. Defective Pixel Correction

8.1 Precautions

When the user executes Defective Pixel Correction and "SAVE", the data at the factory setting will be over-written, so that the data cannot be back to the factory setting data even when "INIT" command was executed. Execute "INIT", then "SAVE" to overwrite the preset data (camera settings) with the factory setting data.

If you do not wish to overwrite the preset data, load the preset data before executing SAVE. The defective pixel correction data will be saved in one area regardless of its preset number.

Since the function only supports the white defects correction, the black defects cannot be corrected.   And, the function is not necessarily able to correct all the white defects. In addition, due to the effect from the noise or the temperature conditions, the correction result may not be always the same.

Please be noted that improper command execution such as under no light-blocking, or taking wrong procedure, may cause incorrect operation of the executed command function or abnormal images.

8.2 How to execute "Defective Pixel Correction"

- Execute "INIT" to return to the factory settings.
- Attach the bundled cap to the lens mount for light-blocking, then wait for about 5 seconds..
- Execute "Defective Pixel Correction" and SAVE.

9. How to Operate the Camera with OCP

Please refer to the "OCP-20" Operational manual.

Overview

IV-Tech developed the universal camera control panel OCP-20 to meet the daily live production requirement. OCP-20 has the full function including real-time feedback of parameters from camera and lens for paint/shading, support broad range of Sony, Incam cameras (please inquire the detail mode).

OCP-20 is easily integrates into a live event ecosystem with other system components:

1, As OCP of the Incam camera, for paint control and lens control of focus, iris.

2, Provide a new camera control product for the camera. Build a camera system with fiber unit FPT-48, wireless control unit LCW-20 for any demands.

Feature

- Support the camera and lens parameter with real-time processing, including iris, master pedestal, white balance, black balance, color temperature, R/B level, gain, shutter, detail level, Gamma, Knee level, Saturation, Matrix, Zoom, Focus etc.
- Reasonable layout according to the function and usage rate for the control button, knob and other components
- Support wide camera brand, including Sony, GV, Incam etc. (pls consult Incam for detail confirmation).
- Support Tally input/output and relay including red and green Tally, enable control of built-in cue lights of camera, connected viewfinders and the additional tally light of ENG and EFP camera.
- Save the camera set up in the scene files
- OCP-20 dimension is same as Sony RCP-1500, can install 4 panels in one rack.

Application

- Work with Incam wireless system, control and paint/shade many EFP camera, ENG camcorder, provide the tally function, it's a good alternative for the original camera manufacturer control panel.
- Directly connect the Incam micro camera to control the picture quality, can extend the transmission distance by the FPT-48/SE200, it integrates in to the daily live ecosystem easily, operates with the familiar traditional camera workflow.
- Support the particular application of camera to solve the bottleneck scene, especially the Steadicam wireless control and Tally indication.

10. How to Operate the Camera with OSD Function

You can operate the camera with OSD menu on a monitor screen by connecting an OCP of camera. The OCP has the "Engineering mode" to access the OSD menu on a monitor.

Please refer to the "OCP-20" Operational manual to know the detail of "Engineering mode".

10.1 Switch Operation of OSD Menu by OCP

[CENTER]: To indicate OSD top menu on your monitor screen when it is not shown. And, it is also used to settle the selected menu.

[▲] Go up the selected item by one.

[▼] Go down the selected item by one.

[◄] Change the options.

[►] Change the options.

Menu with ▼ at the line end indicates that submenu can be opened with the SAVE button.

Menu with ► at the line head indicates that the item is settled with the SAVE button.

10.2 OSD Menu

Top Menu	Setting Menu	Selected Items	Explanation
EXIT	None	None	Push the SAVE button to close OSD menu.
Output Format	Set Video Format	1080p 60fps (Level A)	To set video output format..
		1080p 59.94fps (Level A)	
		1080p 50fps (Level A)	
		1080p 60fps (Level B)	
		1080p 59.94fps (Level B)	
		1080p 50fps (Level B)	
		1080i 60fps	
		1080i 59.94fps	
		1080i 50fps	
		1080p 30fps	
		1080p 29.97fps	
		1080p 25fps	
		1080p 24fps	
		1080p 23.97fps	
		720p 60fps	
		720p 59.94fps	
		720p 50fps	

Top Menu	Setting Menu	Selected Items	Explanation
Gain/Shutter/IRIS	Gain Mode	Manual/Auto	To set Gain Mode.
	Gain Value	0～48dB	To set the Gain Value when Gain Mode is at Manual. ※Note 1/ ※Note 2
	Gain Max Value	0～48dB	To set the Max Gain Value when Gain Mode is at Auto. ※Note 1/※Note 2
	Shutter Mode	Manual/Auto (Typical Value)	To set Shutter Mode.
	Shutter Value	1/25	
		1/30	
		1/36	
		1/42	
		1/50...59,59.1,59.2.	From 1/50 up to 1/1000, the shutter value can be changed by 0.1 adjusting accuracy, for example 1/50.1, 1/50.2.The purpose is to meet the special requirement, like as to match the LED frequency in shooting.
		1/60...60.1,60.2	
		1/75	
		1/90	
		1/100	
		1/105	
		1/120	
		1/125	
		1/150	
		1/180	
		1/210	
		1/250	
		1/300	
		1/350	To set the Shutter Value when Shutter Mode is at Manual. Shutter speed lower than 1/60 shall be limited by the frame rate correspond to the video output format. ※Note 1 ※Note 2 ※Note 3
		1/420	
		1/500	
		1/600	
		1/700	
		1/840	
		1/1000	
		1/1200	
		1/1400	
		1/1700	
		1/2000	
		1/2400	
		1/2800	
		1/3400	
		1/4000	
		1/4800	
		1/5600	
		1/6800	
		1/8000	
		1/9600	
		1/11200	
		1/13600	

Top Menu	Setting Menu	Selected Items	Explanation
Gain/Shutter/IRIS	Shutter Min Limit	Same as Shutter Value	To set the Minimum Shutter Limit when Shutter Mode is at Auto. ※Note 1／※Note 2
	Shutter Max Limit	Same as Shutter Value	To set the Maximum Shutter Limit when Shutter Mode is at Auto. ※Note 1／※Note 2
	Set Shutter Limit	None	Push the SAVE button to settle the shutter limit. When Max < Min is set, the setting will not be valid.
	Iris Mode(Not supported as of today)	Open	Set it to Open when DC Iris is not in use.
		Auto	
	Iris Response Speed(Not supported as of today)	0: Low	To set the response speed of DC Iris when DC Iris is set to Auto. When it is set to High, DC Iris response speed becomes faster. And when it is set to Low, DC Iris response speed becomes slower.
		1: Mid	
		2: High	
	AE Speed	0～15	To set AE convergence speed.
	ExpCompValue	-18～0～18 [dB]	To set Exposure Compensation Value.
	Metering Mode	Average	To set metering mode. Average : Averaging metering Center Weighted : Center weighted metering Spot : Spot metering Backlight Compensation: Backlight compensation metering
		Center Weighted	
		Spot	
		Backlight Comp	
	Spot Block X	0～15	To select the X coordinate value of the Left edge Block of the metering area when Metering Mode is set to "Spot".
	Spot Block Y	0～15	To select the Y coordinate value of the Top Block of the metering area when Metering Mode is set to "Spot".
	Spot Block W	1～16	To select the width (Block number) of the metering area when Metering Mode is set to "Spot".
	Spot Block H	1～16	To select the height (Block number) of the metering area when Metering Mode is set to "Spot".
	Set Spot Block	None	Push the SAVE button to confirm Spot Block, X, Y, W, and H.
	Flicker Cancel	ON/OFF	To set flicker cancel. ※Note 4

※Note 1: If you prefer setting further details, please set them via serial commands.
※Note 2: The values set via serial commands will be reflected to key operation.
※Note 3: There may be gap (small differences) between the set shutter value and the actual shutter value.
    Please refer to the below sheet: Actual Shutter Value limited by output format.

Set Value	Shutter Value	Actual Shutter Value							
		60fps	59.94fps	50fps	30fps	29.97fps	25fps	24fps	23.976fps
1/4000	262	1/3988	1/3984	1/4084	1/3988	1/3984	1/3808	1/4238	1/4234
1/4800	218	1/4847	1/4842	1/4778	1/4522	1/4518	1/5222	1/5027	1/5023
1/5600	187	1/5660	1/5654	1/5756	1/5222	1/5217		1/6177	1/6172
1/6800	154	1/6800	1/6794	1/7237	1/7562	1/7555	1/6412		
1/8000	131	1/7562	1/8508	1/8306			1/8306	1/8010	1/8003
1/9600	109	1/9745	1/9736	1/9745	1/9745	1/9736		1/11389	1/11379
1/11200	94	1/11389	1/11379	1/11787			1/11787		
1/13600	77	1/13701	1/13690	1/14911	1/13701	1/13689			

※Note 4: Flicker cancel function is invalid at 50fps, 25fps, 24fps, and 23.97fps regardless of its settings.

Top Menu	Setting Menu	Selected Items	Explanation
White Balance	WB Mode	Auto	To select WB Mode.
		Outdoor	
		Daylight (Sun light)	
		Cloudy	
		Shade	
		Tungsten	
		Flw (Fluorescent White)	
		Fln (Fluorescent noon white)	
		Fld (Fluorescent day light)	
		Auto(ATW)	
		One push	
		Manual	
		Preset1	
		Preset2	
		Preset3	
		Preset4	
		Preset5	
	WB Red Gain	0～800	To set Red Gain/Blue Gain when WB Mode is at Manual.
	WB Blue Gain	0～800	
	One Push Start	None	Valid only when WB mode is at One Push. Execute One Push WB with the SAVE button.
	Set Preset Number	1～5	To set the preset Number.

Top Menu	Setting Menu	Selected Items	Explanation
Image Control	Red Balance	50～150	To set Red Balance. ※Note 3
	Green Balance	50～150	To set Green Balance. ※Note 3
	Blue Balance	50～150	To set Blue Balance. ※Note 3
	Master Pedestal	-100～100	To set Master Pedestal.
	Red Pedestal	-100～100	To set Red Pedestal.
	Green Pedestal	-100～100	To set Green Pedestal.
	Blue Pedestal	-100～100	To set Blue Pedestal.
	Edge Level	0～7	To set the edge enhancement Level.　0 is OFF.
	Contrast	Contrast -2	To set Contrast and Dynamic range. When D-range Ext is selected, dynamic range will be double of the standard. (Contrast remains as standard level).
		Contrast -1	
		Standard	
		Contrast +1	
		Contrast +2	
		D-range Ext	
	Noise Reduction	OFF/ON	To set Noise Reduction Noise reduction OFF/ON.
	Color Saturation	0～200	To set color saturation.
	Color Correction	Auto	To set color correction.
		Standard	
		Fluorescent light	
		Tungsten lamp	
	Color Suppression	0～7	To set color suppression.
LTC(Not supported as of today)	LTC	ON/OFF	LTC ON/OFF.
	Set LTC Reset	None	To reset LTC with the SAVE button.

※Note 3：The values 0～200 can be set via serial command.

Top Menu	Setting Menu	Selected Items	Explanation
OSD Color Change	Default Set (White & Cyan)	None	To get the OSD color back to the default setting with the SAVE button.
	User Setting		To set the color to display the OSD menu.
	Menu Color	Black	To set OSD menu color.
		Blue	
		Green	
		Cyan	
		Red	
		Magenta	
		Yellow	
		White	
	Highlight Color	Same as Menu Color	
	Set Color	None	Confirm the menu color and the highlight color with the SAVE button. When the same colors are specified for both menu color and highlight color, they will not be settled.
Flip	Horizontal Flip	OFF/ON	Horizontal flip (right and left) OFF/ON
	Vertical Flip	OFF/ON	Vertical flip (top and bottom) OFF/ON
INIT	None	None	To get the camera settings back to the initial settings with the SAVE button.
Save/Load	Set Save Data	0～3	To save the data to the preset number selected, with the SAVE button.
	Really?	NO/YES	To make sure if you really want to save the data to the selected preset.
	Enter	None	To execute SAVE or NOT SAVE, then get back to the original screen.
	Get Save Data	0～3	To call up the data of the selected preset number and reflect it on the screen with the SAVE button.

11. Installation

11.1 Mounting the lens

1	Release the fixing screws (two screws) of lens servo unit till the servo unit can adjustable.	
2	Insert the lens into the lens mount and carefully screw tight it a little.	
3	Adjust the back focal distance.	Pls refer to the the below "Back focal adjustment" part.
4	Adjust the servo units till the gears work with the lens well.	
5	Carefully tighten the fixing screws (two screws) of lens servo unit.	
6	Check the final status--- the lens mount well in the camera.	

Caution:
When the camera is ready to work with the lens, to avoid lens mechanical breakdown, do not manual operate the gears of lens and servo units(which include 4 motor driven gears of iris and focus).
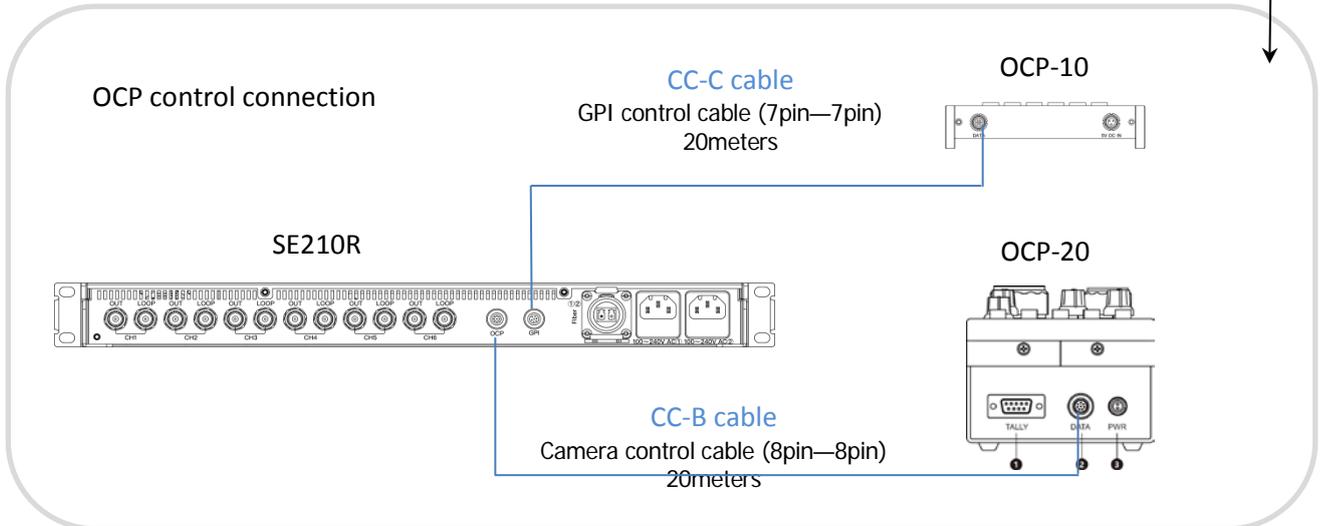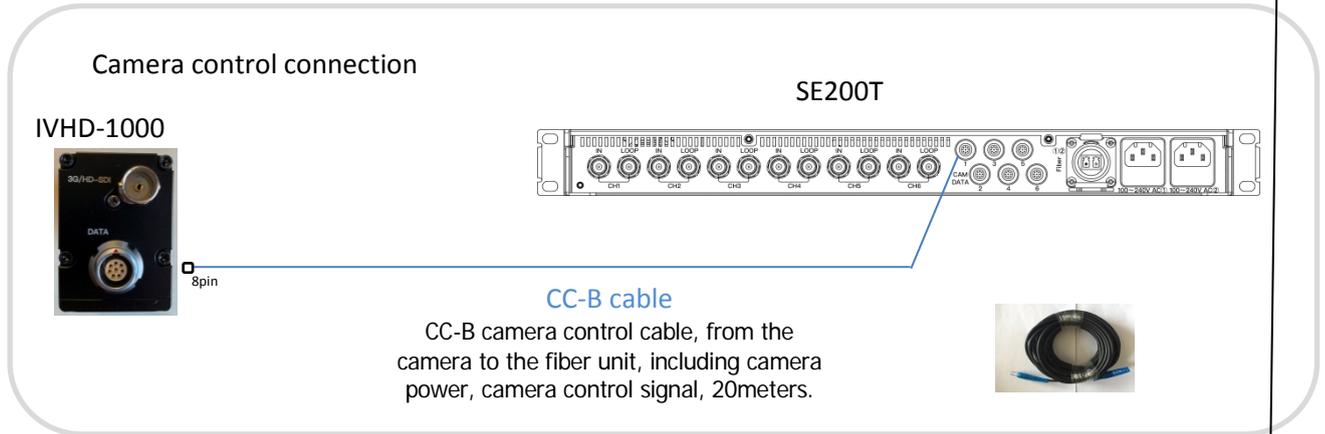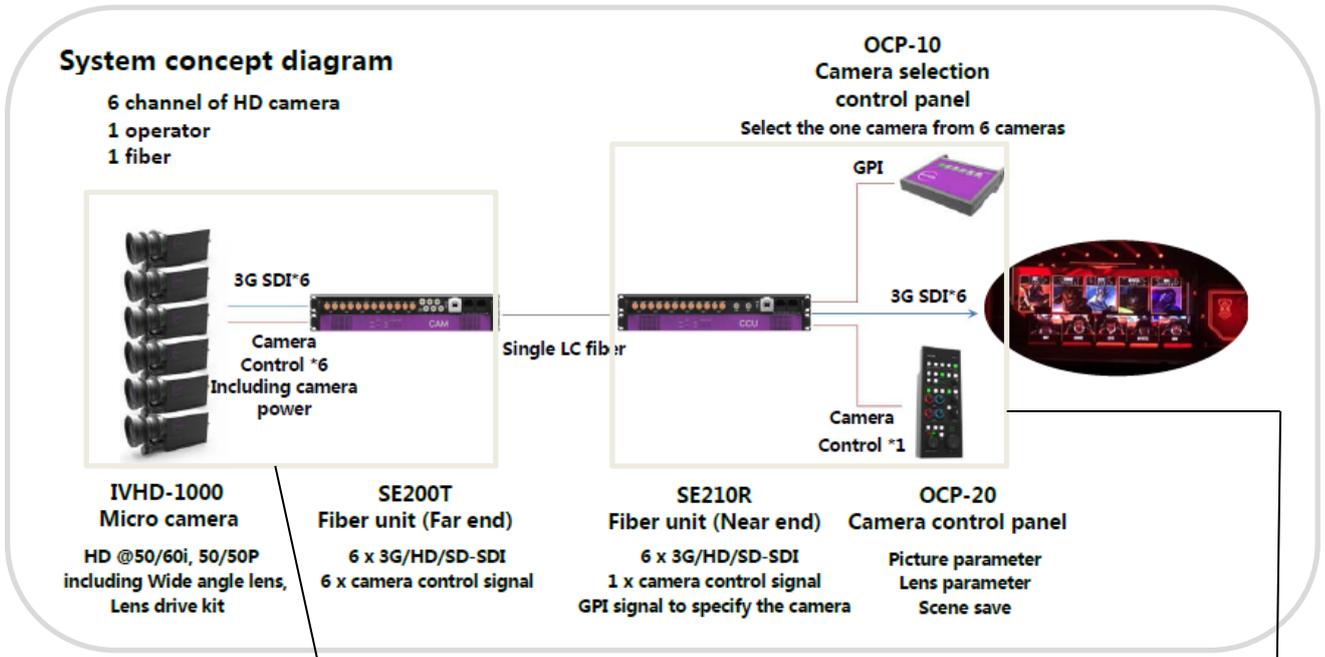
11.2 Remove the lens

1	Release the fixing screws (two screws) of lens servo unit till the gears leave the lens.	
2	Turn the lens in counter-clockwise order while holding the lock ring.	
3	Remove the lens from the camera.	

11.3 Back focal adjustment

If the lens does not stay in focus properly, adjust the back focal length. Make this adjustment before the gears of lens servo unit are joined. The Lock ring of camera is the key element for the focal adjustment; it can lock the distance from the plane of the lens mounting flange to the imaging plane.

No.	Action
1	Place the object, like as the test chart, about 20cm away from the camera, lit well enough to provide a satisfactory video out.
2	Loosen the Lock ring of the camera.
3	Use the focus ring to set the lens to wide angle (minimum focal distance).
4	Point the camera at the object by turning the focus ring and focus on it.
5	Repeat the 3 to 4 until the object stays in focus all the way.
6	Tighten the Lock ring of the camera.
7	Check focus again. Finally tighten the Lock ring strongly.

12. System connection example

Multi-cam fiber transmission system

System concept diagram

6 channel of HD camera
1 operator
1 fiber

OCP-10
Camera selection
control panel
Select the one camera from 6 cameras

GPI

3G SDI*6

3G SDI*6

Camera
Control *6
Including camera
power

Single LC fiber

Camera
Control *1

IVHD-1000
Micro camera

HD @50/60i, 50/50P
including Wide angle lens,
Lens drive kit

SE200T
Fiber unit (Far end)

6 x 3G/HD/SD-SDI
6 x camera control signal

SE210R
Fiber unit (Near end)

6 x 3G/HD/SD-SDI
1 x camera control signal
GPI signal to specify the camera

OCP-20
Camera control panel

Picture parameter
Lens parameter
Scene save

Camera control connection

SE200T

IVHD-1000

8pin

CC-B cable
CC-B camera control cable, from the
camera to the fiber unit, including camera
power, camera control signal, 20meters.

OCP control connection

CC-C cable
GPI control cable (7pin—7pin)
20meters

OCP-10

SE210R

OCP-20

CC-B cable
Camera control cable (8pin—8pin)
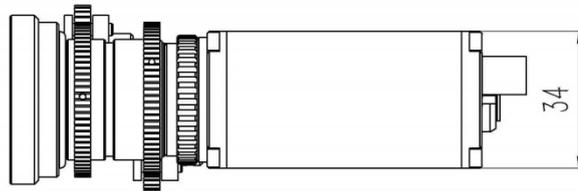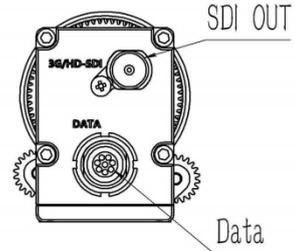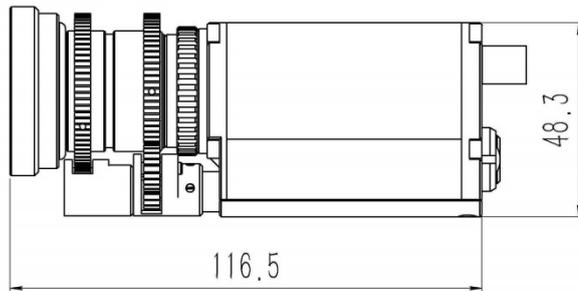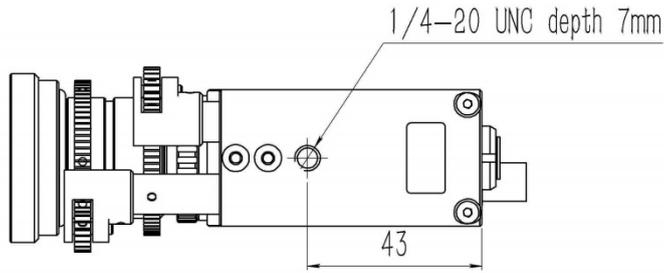20meters

TALLY   DATA   PWR

Never insert or disconnect the camera control cable if the camera/fiber unit is connected
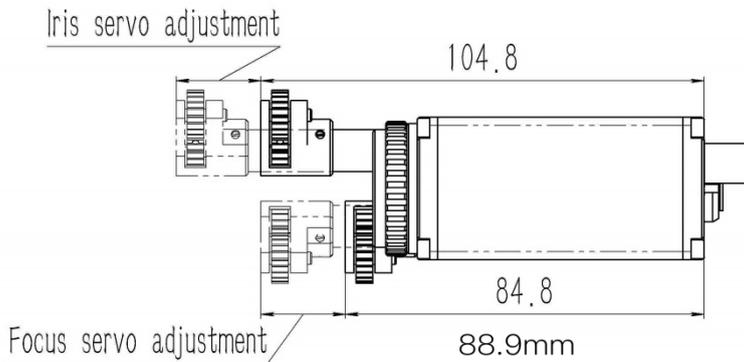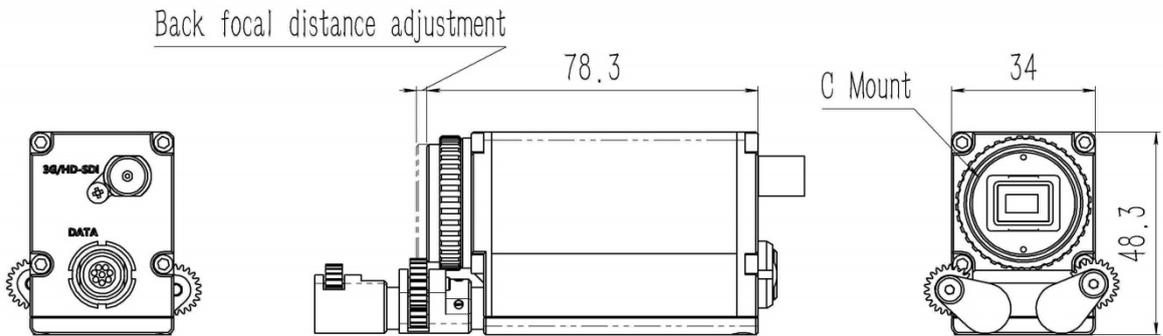to a power source! This could damage the system!

13. Factory Settings

Function	Default Settings
Video Format Setting	1920 x 1080i @60fps
Gain Mode	Auto
Gain Value (Manual Gain)	65536(0dB)
Max Gain	16461899 (48dB)
Shutter Mode	Auto
Shutter Limit Max	17476(1/60s)
Shutter Limit Min	77(1/13600s)
Shutter Value (Manual Shutter)	17476(1/60s)
DC Iris Mode(Not supported as of today)	Open
DC Iris Response Speed(Not supported as of today)	Mid
Metering Mode	Center-Weight
Spot Block	X=7,Y=7, W=2, H=2
Exposure Compensation Value	18 (0dB)
AE Speed	10
Flicker Cancel	OFF
White Balance Setting	Auto
Manual Red Gain	199
Manual Blue Gain	161
Color Correction	Standard
Color Suppression	5
Color Saturation	100
Edge Enhancement	2
Noise Reduction	0
Contrast	Standard
Master Pedestal	0
Pedestal(RGB)	0
Color Balance (RGB)	100
LTC	OFF
OSD Menu Color	White
OSD Select Color	Cyan
H Flip	OFF
V Flip	OFF

14．Dimensions

1/4-20 UNC depth 7mm

43

SDI OUT

DATA

Data

48.3

116.5

34

The lens is Kowa LM3NCM.
The camera can support many lens.

Back focal distance adjustment

78.3

C Mount

34

48.3

Iris servo adjustment

104.8

84.8

Focus servo adjustment

88.9mm

Standard business card

50.8mm

15. Cases for Indemnity (Limited Warranty)

The term of warranty of this product is within 1 year from the date of shipping out from our factory.
If you use the product properly and discover a defect during the warranty period, and if that was caused by designing or manufacturing, IV-TECH, at its option, repairs or replaces it at no charge to you.
Products out of warranty period will be subject to charge. IV-TECH repairs the products as long as it is repairable.

IV-TECH shall be exempted from taking responsibility and held harmless for damages or losses incurred by the following cases.

a)   In case damages or losses are caused by earthquake, lightning strike, fire, or other acts of God.
b)   In case damages or losses are caused by deliberate or accidental misuse by the user, or failure to observe the information contained in the instructions in this Product Specification and Operational Manual.
c)   In case damages or losses are caused by repair or modification conducted by the customer or any unauthorized party.

16. CMOS Pixel Defect

IV-TECH compensates the noticeable CMOS pixel defects found at the shipping inspection prior to our shipment. On very rare occasions, however, CMOS pixel defects might be noted with time of usage of the products. Cause of the CMOS pixel defect is the characteristic phenomenon of CMOS sensor itself and IV-TECH is exempted from taking any responsibilities for them. Should you have any questions on CMOS pixel defects compensation please contact us.

17. Product Support

Should you have any problems in function of the product you purchased, and if you need our further analysis and/or repair, please contact the dealer or IV-TECH.

Beijing Insight Visual Technology Co.,Ltd

Incam product: new camera tracking system, remote heads, micro camera, universal wireless camera control system, optical transmission product, customer-made product etc.

IVHD-1000 Micro camera operation manual

Release date：2019/01

Features, design, and specifications are subject to change without notice.