datavideo

FULL HD BLOCK CAMERA

BC-50

Instruction Manual

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FCC Compliance Statement

This device complies with part 15 of the FCC rules. Operation is subject to the following two conditions:

(1)   This device may not cause harmful interference, and
(2)   This device must accept any interference received, including interference that may cause undesired operation.

Warnings and Precautions

1.   Read all of these warnings and save them for later reference.
2.   Follow all warnings and instructions marked on this unit.
3.   Unplug this unit from the wall outlet before cleaning. Do not use liquid or aerosol cleaners. Use a damp cloth for cleaning.
4.   Do not use this unit in or near water.
5.   Do not place this unit on an unstable cart, stand, or table. The unit may fall, causing serious damage.
6.   Slots and openings on the cabinet top, back, and bottom are provided for ventilation. To ensure safe and reliable operation of this unit, and to protect it from overheating, do not block or cover these openings. Do not place this unit on a bed, sofa, rug, or similar surface, as the ventilation openings on the bottom of the cabinet will be blocked. This unit should never be placed near or over a heat register or radiator. This unit should not be placed in a built-in installation unless proper ventilation is provided.
7.   This product should only be operated from the type of power source indicated on the marking label of the AC adapter. If you are not sure of the type of power available, consult your Datavideo dealer or your local power company.
8.   Do not allow anything to rest on the power cord. Do not locate this unit where the power cord will be walked on, rolled over, or otherwise stressed.
9.   If an extension cord must be used with this unit, make sure that the total of the ampere ratings on the products plugged into the extension cord do not exceed the extension cord rating.
10.   Make sure that the total amperes of all the units that are plugged into a single wall outlet do not exceed 15 amperes.
11.   Never push objects of any kind into this unit through the cabinet ventilation slots, as they may touch dangerous voltage points or short out parts that could result in risk of fire or electric shock. Never spill liquid of any kind onto or into this unit.

12. Except as specifically explained elsewhere in this manual, do not attempt to service this product yourself. Opening or removing covers that are marked "Do Not Remove" may expose you to dangerous voltage points or other risks, and will void your warranty. Refer all service issues to qualified service personnel.
13. Unplug this product from the wall outlet and refer to qualified service personnel under the following conditions:
    a. When the power cord is damaged or frayed;
    b. When liquid has spilled into the unit;
    c. When the product has been exposed to rain or water;
    d. When the product does not operate normally under normal operating conditions. Adjust only those controls that are covered by the operating instructions in this manual; improper adjustment of other controls may result in damage to the unit and may often require extensive work by a qualified technician to restore the unit to normal operation;
    e. When the product has been dropped or the cabinet has been damaged;
    f. When the product exhibits a distinct change in performance, indicating a need for service.

Thank you for choosing a Datavideo product, and for using our electronic registration form.

Standard Warranty

- Datavideo equipment are guaranteed against any manufacturing defects for one year from the date of purchase.

- The original purchase invoice or other documentary evidence should be supplied at the time of any request for repair under warranty.

- Damage caused by accident, misuse, unauthorized repairs, sand, grit or water is not covered under warranty.

- Viruses and malware infections on the computer systems are not covered under warranty.

- Any errors that are caused by unauthorized third-party software installations, which are not required by our computer systems, are not covered under warranty.

- All mail or transportation costs including insurance are at the expense of the owner.
- All other claims of any nature are not covered.
- Cables and batteries are not covered under warranty.
- Warranty only valid in the country or region of purchase.
- Your statutory rights are not affected.

Three Year Warranty

- All Datavideo products purchased after July 1st, 2017 are qualified for a free two years extension to the standard warranty, providing the product is registered with Datavideo within 30 days of purchase.
- Certain parts with limited lifetime expectancy such as LCD panels, DVD drives, Hard Drive, Solid State Drive, SD Card, USB Thumb Drive, Lighting, Camera module, PCIe Card are covered for the first 10000 hours, or 1 year (whichever comes first).
- Any three-year warranty claims must be made to your local Datavideo office or one of its authorized Distributors before the extended warranty expires.

Disposal

For EU Customers only - WEEE Marking
This symbol on the product or on its packaging indicates that this product must not be disposed of with your other household waste. Instead, it is your responsibility to dispose of your waste equipment by handing it over to a designated collection point for the recycling of waste electrical and electronic equipment. The separate collection and recycling of your waste equipment at the time of disposal will help to

conserve natural resources and ensure that it is recycled in a manner that protects human health and the environment. For more information about where you can drop off your waste equipment for recycling, please contact your local city office, your household waste disposal service or the shop where you purchased the product.

CE Marking is the symbol as shown on the left of this page. The letters "**CE**" are the abbreviation of French phrase "Conformité Européene" which literally means "European Conformity". The term initially used was "EC Mark" and it was officially replaced by "CE Marking" in the Directive 93/68/EEC in 1993. "CE Marking" is now used in all EU official documents.

1. Introduction

The BC-50 is a cost-effective Full HD block camera which equips TAMRON high quality super telephoto lens with 20X optical zoom and 16X digital zoom (optional). The BC-50 Block Camera is a small HD camera that can deliver compressed video signals such as H.264, H.265 and MJPEG. The BC-50 block camera is made with sturdy and durable metal case which is suitable for HD camera applications in different environments. Moreover, the BC-50 block camera supports Panasonic 1/2.7 inch 2.07 million pixels high quality HD CMOS sensor which can achieve maximum 1920x1080 high quality image. Furthermore, the BC-50 block camera also supports PoE(Power over Ethernet)(optional) for uses to reduce their engineering cost.

Features
- HD Resolution: 1/2.7" High Definition 2.07 M Pixels CMOS sensor
- 20x optical zoom
- High definition formats supported:
    HD: 1080p/60/50/30/25
    1080i/60/50
    720p/60/50
- 2D & 3D Digital Noise Reduction Function (DNR) to reduce the noise and enable clearer image under low light conditions.
- Video Output: 3G-SDI outputx1, Network outputx1
- Support for external 3.5mm wire connecting with TB-5 Tally Box
- Support for ultra-high frame rate up to 60fps in 1080P
- Support for PoE(Power over Ethernet)(optional)
- Support for ICR Infrared Filter with auto switch which is useful for 24/7 surveillance
- Support for AAC Audio Encoding

2. System Diagram
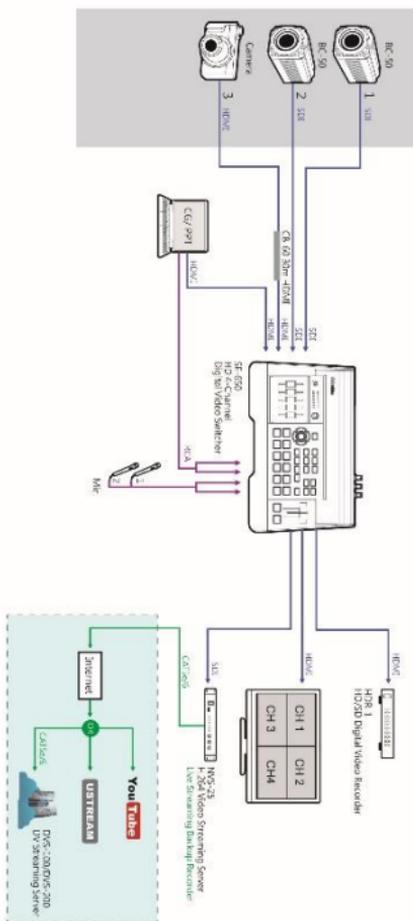
3. Connections

Front View

Tally Light	This tally LED is used to receive the tally signal by the 3.5mm wire from the tally box connected to the switcher. If the switcher transmits a PGM signal to the camera, the tally LED will light on in red. However, if the camera receives a PVW signal from the switcher, the tally LED will light on in green.
Lens	Camera lens for capturing images.

Rear Panel
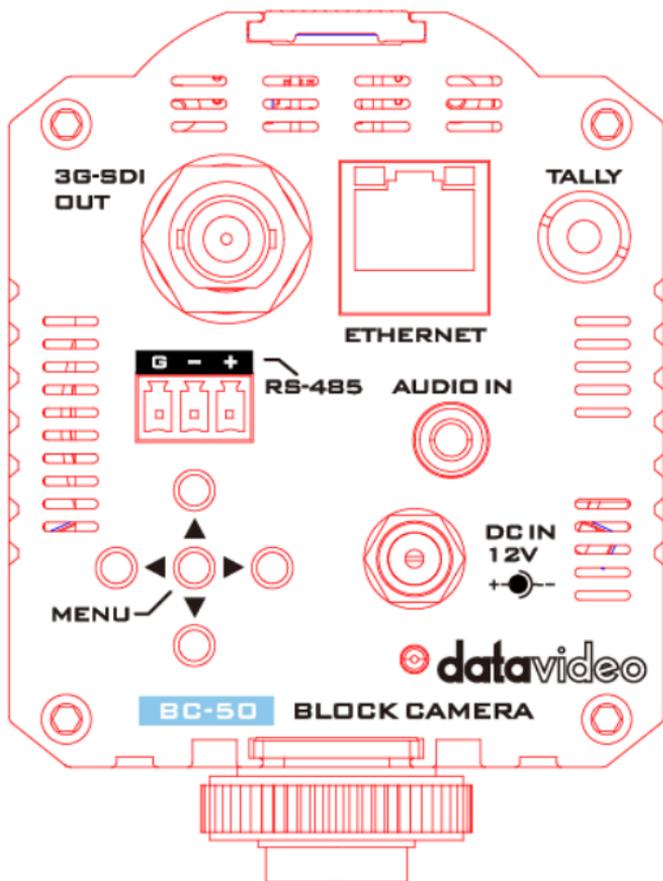
	3G-SDI Output	Video output connected to SDI port of the monitor.
	RS-485 Control Port	Control port using the RS-485 control protocol. The max. distance is 1200m
	12V DC Power IN	DC in socket connects the supplied 12V PSU. The connection can be secured by screwing the outer fastening ring of the DC In plug to the socket.
	Power LED Indicator	The power LED keeps flashing when the camera is powered on.
	Tally Signal Port	This port is used to receive tally signal by the 3.5mm wire from the Tally Box.
	Audio IN Port	It is the 1CH 3.5mm Audio IN interface.
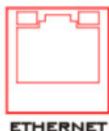
Ethernet Interface

This Ethernet interface is used for the internet connection for the BC-50 HD camera. Moreover, this interface also serves as the output interface through the internet cable.
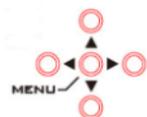
MENU/Up /Down/Left /Right Keys

This menu key set includes MENU/Up/Down/Left /Right keys. The MENU key is also the confirming key in menu selection. The Up key represents the Zoom-in function and the Down key represents the Zoom-Out function when the camera is in normal operation.

4. OSD Menu Options

On-Screen Menu allows the user to change various camera settings such as shooting conditions and the system setup. Press **MENU** button on the **rear panel of the BC-50** to enter the on-screen menu as shown below. The BC-50 HD camera provides five keys on the rear panel including MENU, Up, Down, Left side and Right side for users to control the camera. Please see following tables for MENU options of each category.

```
MENU
1. Exposure
2. Color
3. Image
4. Focus
5. Noise Reduction
6. Setting
7. Information
8. Restore Factory Settings
9. Exit
```

Main Options	Exposure	Color	Image	Focus	Noise Reduction
Sub-Options	1.Mode	1.WB Mode	1.Luminance	1.D-Zoom Limit	1.2D NR
	2.ExpCompMod	2.AWB Sens	2.Contrast	2.AF Sensitivity	2.3D NR
	3. ExpComp	3.RG Tuning	3.Sharpness	3.Auto Focus	3.Return
	4. GainLimit	4.BG Tuning	4.Flip-H	4.Return	
	5. Backlight	5.Saturation	5.Flip-V		
	6. DRC Strength	6.Hue	6.Gamma		
	7. Anti Flicker	7.Return	7.Style		
	8. Return		8.Return		

Main Options	Setting	Information	Restore Factory Settings	Exit	
Sub-Options	1.Language	1.Version	1.Yes		
	2.Protocol	2.Model	2.No		
	3.VISCA Address	3.Date	3.Return		
	4.Baudrate	4.AF Version			
	5.Video Format	5.IP			
	6.Lens	6.Gateway			
	7.Return	7.Netmask			
		8.Return			

1st Layer Main Options	2nd Layer Sub-Options	3rd Layer Parameter
1.Exposure	1.Mode	Auto
		Bright
		Iris Priority
		Shutter Priority
		Manual
		WDR
	2.ExpCompMod	On
		Off
	3.ExpComp	-7
		-6
		-5
		-4
		-3
		-2
		-1
		0
		1
		2
		3
		4
		5
		6
		7
	4.Gain Limit	0
		1
		2
		3
		4
		5
		6
		7
		8
		9
		10
		11
		12
		13

			14
			15
		5.Backlight	On
			Off
		6.DRC Strength	0
			1
			2
			3
			4
			5
			6
			7
			8
		7.Anti Flicker	50Hz
			60Hz
			Off
		8.Return	
2.Color		1.WB Mode	Auto
			3000K/Indoor
			4000K
			5000K/Outdoor
			6500K-1
			6500K-2
			6500K-3
			One Push
			Manual
		2.AWB Sens	Low
			Middle
			High
		3.Saturation	60%
			70%
			80%
			90%
			100%
			180%
			110%
			120%
			130%
			140%
			150%

		160%
		170%
		180%
		190%
		200%
	4.Hue	0
		1
		2
		3
		4
		5
		6
		7
		8
		9
		10
		11
		12
		13
		14
	5.Return	
3.Image	1.Luminance	0
		1
		2
		3
		4
		5
		6
		7
		8
		9
		10
		11
		12
		13
		14
	2.Contrast	0
		1
		2
		3
		4
		5

		6
		7
		8
		9
		10
		11
		12
		13
		14
	3.Sharpness	0
		1
		2
		3
		4
		5
		6
		7
		8
		9
		10
		11
		12
		13
		14
	4.Flip-H	On
		Off
	5.Flip-V	On
		Off
	6.Gamma	default
		0.45
		0.5
		0.56
		0.63
	7.Style	Norm
		Clarity
		Bright
		Soft
		5S
		Clarity (new)

	8.Return						
4.Focus	1.D-Zoom Limit	X1					
	2.AF Sensitivity	Low					
		Middle					
		High					
	3.Auto Focus	On					
		Off					
	4.Return						
5.Noise Reduction	1. 2D NR	1					
		2					
		3					
		4					
		5					
		Close					
		Auto					
	2. 3D NR	1					
		2					
		3					
		4					
		5					
		6					
		7					
		8					
		Close					
	3.Return						
6. Setting	1.Language	English					
		Traditional Chinese					
		Simplified Chinese					
	2.Protocol	VISCA					
		PELCO-P					
		PELCO-D					
	3.Address	VISCA Address	1	P-P Address	0~31	P-D Address	0~254
			2				
			3				
			4				
			5				
			6				
			7				
	4.Baud Rate	38400					
		19200					
		9600					

		4800
		2400
	5.Video Format	1080P25
		1080P50
		1080I50
		720P50
	6.Lens	Type1
		Type2
	7.Return	
7.Information	1.Version	
	2.Model	
	3.Date	
	4.AF Version	
	5.IP	
	6.Gateway	
	7.Netmask	
	8.Return	
8.Restore Factory Settings	1.Yes	
	2.No	
	3.Return	
9.Return		

5. Serial Port Command Description

Once the BC-50 block camera is turned on and initialized, the VISCA command can be transferred for communication through the RS-485 and the RS-232 serial ports. The camera provides the following commands to control the camera function.

Functions	Command Packets	Notes
UP	8x 01 06 01 08 08 03 01 FF	Equivalent to the four direction keys on the rear panel.
DOWN	8x 01 06 01 08 08 03 02 FF	
LEFT	8x 01 06 01 08 08 01 03 FF	
RIGHT	8x 01 06 01 08 08 02 03 FF	
OK	8x 01 04 0B 02 FF or 8x 01 04 0B 03 FF	Equivalent to the 【MENU】 Key on the rear panel.

x: Camera address number

6. Equipment Setup and Internet Connection

6.1. Operating Environment

Operating System	Windows2000/2003/XP/Vista/7/8
Network Protocol	TCP/IP
Client PC	P4/128MRAM/40GHD/ support scaled graphics card, support DirectX8.0 or more advanced version.

6.2. Equipment Installation

Please follow following steps for installing the BC-50 Full HD block camera.

(1) Connect BC-50 directly to your internet or to your PC through internet cable.

(2) Turn on the DC 12V power source when the BC-50 camera is connected with the DC 12V power cable.

(3)   When the power is connected, the orange light of the internet port will light on. After that, the green light will flash and then the physical connection of the BC-50 is completed.

6.3. Internet Connection

Please refer to following figures for connecting the internet camera and the computer or notebook PC.
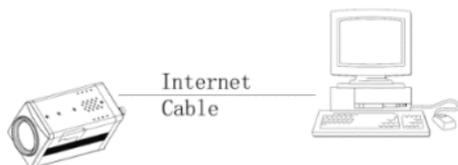
Figure1. Internet connection between the BC-50 and PC through internet cable
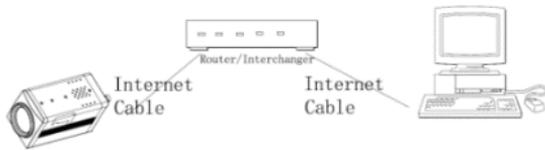
Figure2. Internet connection between the BC-50 and PC through router/interchanger

7. Visit and Control the BC-50 by LAN

7.1. Setup the IP Address
The default IP address of the BC-50 Full HD block camera is "**192.168.100.99**". For users who do not know the BC-50 IP address, there are two ways for them to setup the IP address as following.

Method 1: Connect the BC-50 Full HD block camera to a monitor or TV. After that, please press the **MENU** key on the rear panel of the camera. After entering into the main menu, please select the **Information**, and then the camera IP of the BC-50 will be shown on the screen.

Method 2: Please connect the BC-50 Full HD block camera to the PC at first through the internet cable. After that, please double click the software "upgrade_En.exe" to search for the IP address.

7.2. Change the IP Address
For users who want to change the IP address of the BC-50 Full HD block camera, there are two methods that are shown as following.

Method 1:
1. Please connect the fixed network cable to the WAN port of a router.
2. Connect the BC-50 Full HD block camera to the router with an internet cable.
3. Please connect your PC/notebook PC to the router with an internet cable.
4. After that, open your browser, input the default IP address "**192.168.100.99**", and a window will pop-up and ask you to input the user name and password. The default user name & password is "**admin**".
5. And then you can see the web control page of the BC-50 Full HD block camera.
6. Click the "Network" on the left column and then you can see the network setting page.
7. After that, input new IP address in the blank of the IP address item as shown as following.

8. Click "**Apply**"
9. Please restart the BC-50 Full HD block camera.

Method 2.
Please open the software "upgrade_En.exe", input the new IP and then click "**Set**" as shown in the following.

Note: The default IP address of the BC-50 Full HD block camera is "**192.168.100.99**", and the default user/password is "**admin**". After the IP address is modified, the BC-50 Full HD block camera will be restarted.

7.3. Visit/Access the BC-50

For users who want to visit/access the BC-50 Full HD block camera through the web interface, please refer to following steps.

1. Input the default IP address of the BC-50, "**192.168.100.99**" to the internet browser (it's recommended to use IE web browser)

2. After that, a login window will pop-up and then input the default user name/password "**admin**".

3. After entering into the web control page, the screen will be shown as following.

Note: For users who want to use the BC-50 Full HD block camera through the Internet for the first time (**for new user Only**), the VLC player software must be installed. For downloading VLC player, please go to VLC website: http://www.videolan.org/vlc. After installation, please login again, and the screen will show as above mentioned.

7.4. Visit the BC-50 by the Dynamic DNS

Set the domain name to the BC-50 Full HD block camera. After that, please setup the parameter. And then the dynamic DNS can access the camera. The format of the access link is shown as following.

Dynamic DNS Access Link: http://hostname :port number

For example, setup the host computer name and the camera port number as following.

Host computer name: youdomain.f3322.org,

Camera port number: 554,

The Access link should be: http://youdomain.3322.org:554.

Note: If the camera port is defaulted as **80**, and then it is unnecessary for users to input the port number. It's enough to use the host name to access the BC-50 Full HD block camera directly.

7.5. VLC Stream Media Player Monitoring

For setting the VLC Stream Media Player. Please refer to following steps.

1. Open the VLC media player,

2. Click "**Media**"->"**Open Network Steam** ", or click "**Ctrl+N**"
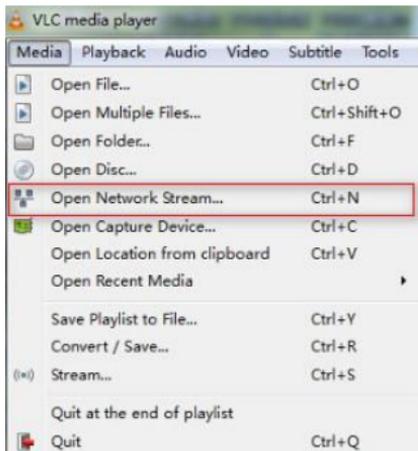
3. After that, please input URL addresses as following.

- rtsp://ip: port number/1 (First stream);
- rtsp://ip: port number/2 (Second stream).

Note: The default RTSP port number is 554
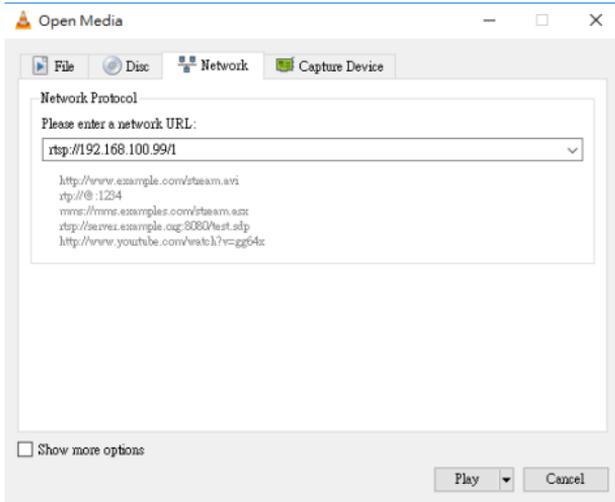
7.6. Parameter Setting

7.6.1 Home Page Introduction
Menu

All pages include two menu bars which are shown as following.

Menu Bar	Function
Real Time Monitoring	Display video image
Parameter Setup	Include function buttons

Video Viewing Window

The resolution of the video viewing window must be the same as the video resolution. Higher resolution achieves larger playing area. If you want to enlarge the video viewing window to full-screen size, please double-click the viewing window. If you want to shrink the viewing window to its initial size, what you have to do is to double-click the full-screen window again. The status bar of the viewing window is shown as below.

The control buttons of the status bar are described as following.

- Video playback pause button: Users can use this button to control real-time video pause/stop. When the real-time video playing is paused or stopped, click this button again can resume the video playing.
- Audio control button: This button can set the video playing in silent mode.
- Full screen switch button: Users can use this button to switch between full-screen and normal size screen.

Language Selection

The homepage control interface of the BC-50 Full HD block camera provides four language options for users including English, simplified Chinese, traditional Chinese and Russian.

7.6.2 Media Setting for the Home Page Control Interface

For media setting, please click the **Video** option on the homepage control interface as shown as following.
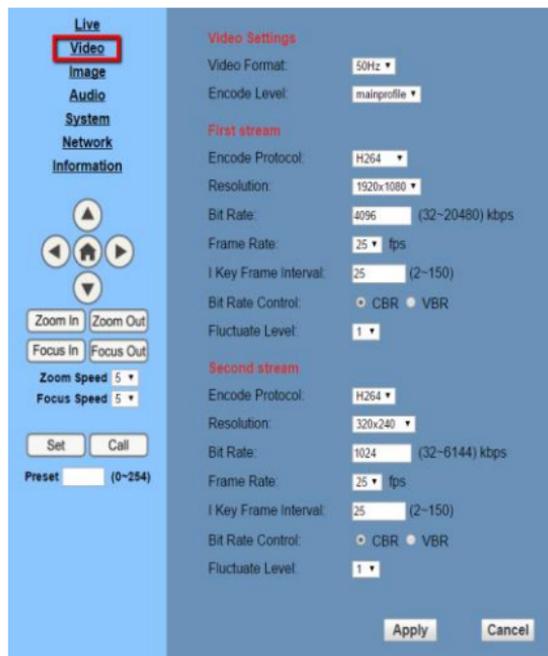
Video Setting Options	Functions
Video Format	Support three formats including 50Hz,60Hz and OSD
Encode Level	Support three encode levels including baseline, mainprofile and highprofile.

Encode Protocol	Support three encode protocol including H.265, H.264 and MJPEG.
Resolution	First bit flow support resolutions as following: 1920x1080 1280x720 1024x576 960x540 640x480 640x360 Second bit flow support resolutions as following 50Hz: 1280x720 1024x576 720x576 720x408 640x360 480x270 320x240 60Hz: 1280x720 1024x576 720x480 720x408 640x360 480x270 320x240 **Note:** Higher resolution achieves clearer image. However, it occupies more network bandwidth.
Bit Rate	Users can set bit rate by this function. Generally speaking, higher bit rate achieves clearer image. However, it depends on network bandwidth situation. If the network bandwidth is insufficient and the allocated bit flow value is too high, it is hard for the video signal flow to transmit normally. Finally, it will cause worse video quality.
Frame Rate	Users can determine the frame rate by adjusting this option. Higher frame rate achieves smoother image quality. However, users will feel more screen beating if the frame rate is too low.
I Key Frame Interval	This function can set interval from 2 to 150. Higher interval value causes lower response rate from the viewing window.

Bit Rate Control	There are two ways for bit rate control including constant bit rate and variable bit rate. Constant bit rate: Video coder will do the coding according to preset speed. Variable bit rate: Video coder will adjust the coding speed based on the preset value to gain best image quality.
Fluctuate Level	This function is to restrain the fluctuation magnitude of the variable rate. Users can select grade 1 to 6 to set this level.

7.6.3 System Setting for the Home Page Control Interface

For system setting, please click the **System** option on the homepage control interface as shown below.
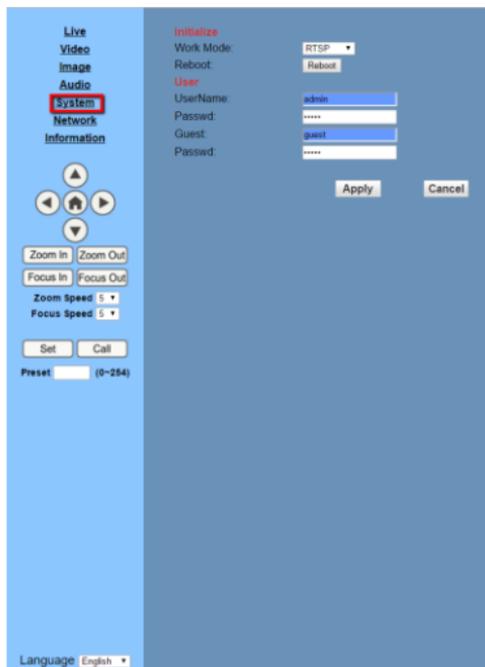
System Setting Options	Functions
Work Mode	The BC-50 provides the RTSP work mode for users.
Reboot	Click "Reboot" button, and then the system will be restarted.

User name and Password	Users can modify user name and password through this option. Only letters and numbers are allowed for password setting.
Apply/Cancel	Users can modify password and click the "Apply" button to the login page. Press "cancel" button to cancel the password change.

7.6.4 Network Setting for the Home Page Control Interface

For Network setting, please click the **Network** option on the homepage control interface as shown as following.
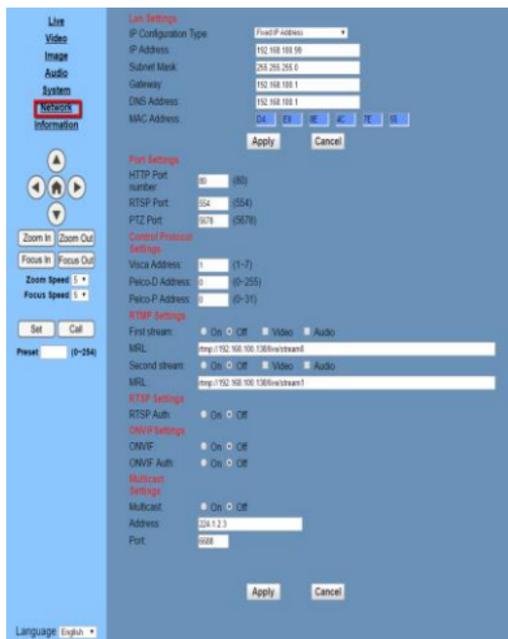
Network Setting Options	Functions
IP Configuration Type	There are two IP configuration types for users including "Fixed IP Address" and "Dynamic IP Address".
IP Address	The default IP address for the BC-50 Full HD block camera is "192.168.100.99".

Subnet Mask	The default IP Subnet Mask for the BC-50 Full HD block camera is "255.255.255.0".
Gateway	The default Gateway for the BC-50 Full HD block camera is "192.168.100.1".
DNS Address	The default DNS Address for the BC-50 Full HD block camera is "192.168.100.1".
MAC Address	The MAC address can be modified by users.
HTTP Port Number	IP address identifies the network device. The network device can run various web applications. However, network programs use port to transmit data. The data transmission is between port to port. The port setting is to determine which port is used by the WEB SERVER for the data transmission. If users need to set the port mapping, please remember that it is a must that the port number must be consistent. (The default port number: 80)
RTSP Port	The BC-50 Full HD block camera supports RTSP port. Please use the VLC tools for broadcasting.
PTZ Port	The BC-50 Full HD block camera supports PTZ port. The default port is "5678".
Control Protocol Setting(VISCA/ Pelco-D/Pelco-C Address)	These options are used for the control protocol setting for the BC-50 Full HD block camera including VISCA, Pelco-D and Pelco-C addresses.
RTMP Setting	The RTMP setting is used to set the camera stream. It can set up to two streams. Users can select the control options including "On","Off", "Video" and "Audio" for the first stream or the second stream.
RTSP Setting	Users can set the network RTSP protocol "On", "Off" through this option.
ONVIF Setting	Users can set the ONVIF protocol and ONVIF authorization "On","Off" through this option.
Multicast Setting	Users can set the Multicast "On", "Off" and the multicast address and port through this option. The default multicast address is "224.1.2.3". The default multicast port is "6688".

Apply/Cancel	Modify network parameters and then press "Apply" to confirm the modification. Press "Cancel" to cancel the network parameters modification.

7.7. Device Information

Users can find the device information of the BC-50 Full HD block camera by clicking the "**Information**" option on the left-side.
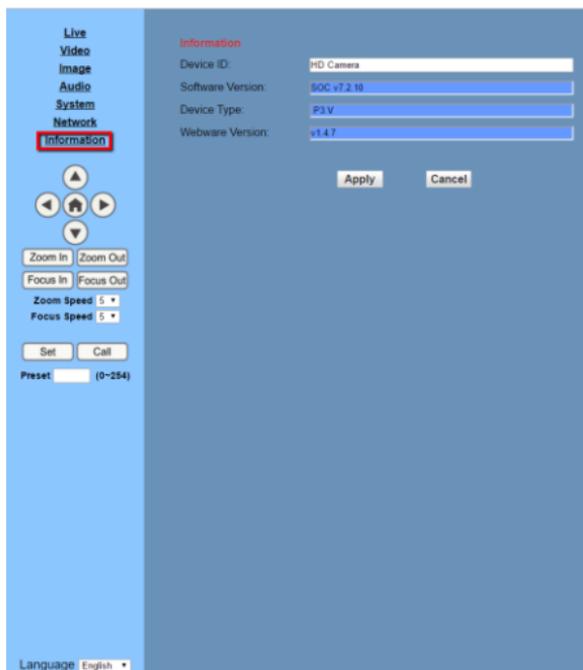
7.7.1 Download the Network Upgrade Program

For users who need to download the BC-50 Full HD block camera upgrade program, please contact your local Datavideo sales representative or office.

8. Maintenance & Warnings

8.1. Maintenance
In order to prevent the BC-50 Full HD block camera from broken, there are some tips or reminders for users to keep in mind about the maintenance and troubleshooting of the BC-50 Full HD block camera.

- **Maintenance of the BC-50 Full HD Block Camera**
  If the BC-50 Full HD block camera is not used for a long time, please remember to disconnect the power cable from the BC-50, so that the BC-50 can be turned off completely for safety consideration. At the same time, please remember to disconnect the power adapter from the AC socket. For storing the BC-50, please remember to clear the dust on the camera housing by soft cloth or cotton paper. If users want to clean the camera lens, please remember to use dry soft cloth for wiping. If the BC-50 is very dirty, please use neutral detergent to wipe gently. DO NOT use strong or corrosive cleaner so as to avoid the lens scratches to affect the image quality.

- **Avoid Camera Operation in the Environment that Exceeds its Maximum Intensity of Illumination**
  The BC-50 Full HD Block camera may not achieve its best image quality if it is operated in the environment that the maximum intensity of illumination exceeds the tolerance of the BC-50 Full HD block camera.

- **Avoid Using the BC-50 for Following Situation**
  Users should avoid shooting for ultra-bright objects such as sunshine and lamplight, etc. Please remember that do not use the BC-50 Full HD block camera in unstable lighting environment or it may cause flashing image condition.

- **Do Not Use the BC-50 near Facilities with High Power Radio Waves**
  Please remember that the BC-50 Full HD Block camera can not be used near facilities that will generate high power radio waves such as television station and radio transmitter, etc.

9. Failures & Troubleshooting

Image	
Failures	**Troubleshooting Steps**
Display shows no image	1. Check whether the camera power supply is connected correctly 2. Check whether the supply voltage is correct 3. Check whether the power light is lit. 4. Check whether the video platform and the TV cable are connected correctly. 5. Check the manual lens aperture and open the aperture.
Sometimes there is no image	1. Check whether the video platform and the TV cable are connected correctly. 2. Check whether the camera is installed stably and please assure that there is no strong shock.
Image Blurring	1. Check whether the focus of the camera lens is accurate. 2. Check whether the surface of the lens is clean.
Control	
Camera can't be controlled by the serial port	1. Check whether the camera control parameter is set correctly. 2. Check whether the control wire is connected correctly.

10. VISCA Command List

10.1. Camera-Issued Messages

Ack/Completion Message			
Command	**Function**	**Command Packet**	**Comments**
ACK/Comletion Messages	ACK	z0 4y FF (y: Socket No.)	Return when the command is accepted.
	Completion	z0 5y FF (y: Socket No.)	Return when the command has been executed.

z = Camera Address + 8

Error Messages			
Command	**Function**	**Command Packet**	**Comments**
Error Messages	Syntax Error	z0 60 02 FF	Returned when the command format is different or when a command with illegal command parameters is accepted.
	Command Buffer Full	z0 60 03 FF	Indicates that two sockets are already being used(executing

			two commands) and the command could not be accepted when received.
	Command Canceled	z0 6y 04 FF (y: Socket No.)	Returned when a command which is being executed in a socket specified by the cancel command is canceled. The completion message for the command is not returned.
	No Socket	z0 6y 05 FF (y: Socket No.)	Returned when no command is executed in a socket specifild by the cancel command, or when an invalid socket

			number is specified.
	Command Not Executable	z0 6y 41 FF (y: Execution command Socket No. Inquiry command: 0)	Returned when a command canot be executed due to current conditions.For example, when commands controlling the focus manually are received during auto focus.

10.2. Camera Control Command

Command	Function	Command Packet	Comments
AddressSet	Broadcast	88 30 01 FF	Address setting
IF_Clear	Broadcast	88 01 00 01 FF	I/F Clear
CAM_Power	On	8x 01 04 00 02 FF	Power ON/OFF
	Off	8x 01 04 00 03 FF	
CAM_Zoom	Stop	8x 01 04 07 00 FF	
	Tele(Standard)	8x 01 04 07 02 FF	
	Wide(Standard)	8x 01 04 07 03 FF	

	Tele(Variable)	8x 01 04 07 2p FF	p = 0(low) - 7(high)
	Wide(Variable)	8x 01 04 07 3p FF	
	Direct	8x 01 04 47 0p 0q 0r 0s FF	pqrs: Zoom Position
CAM_Focus	Stop	8x 01 04 08 00 FF	
	Far(Standard)	8x 01 04 08 02 FF	
	Near(Standard)	8x 01 04 08 03 FF	
	Far(Variable)	8x 01 04 08 2p FF	p = 0(low) - 7(high)
	Near(Variable)	8x 01 04 08 3p FF	
	Direct	8x 01 04 48 0p 0q 0r 0s FF	pqrs: Focus Position
	Auto Focus	8x 01 04 38 02 FF	AF On/Off
	Manual Focus	8x 01 04 38 03 FF	
	Auto/Manual	8x 01 04 38 10 FF	
CAM_ZoomFocus	Direct	8x 01 04 47 0p 0q 0r 0s 0t 0u 0v 0w FF	pqrs: Zoom Position tuvw: Focus Position
CAM_WB	Auto	8x 01 04 35 00 FF	Normal Auto
	Indoor mode	8x 01 04 35 01 FF	Indoor mode

	Outdoor mode	8x 01 04 35 02 FF	Outdoor mode
	OnePush mode	8x 01 04 35 03 FF	One Push WB mode
	Manual	8x 01 04 35 05 FF	Manual Control mode
	OnePush trigger	8x 01 04 10 05 FF	One Push WB Trigger
CAM_RGain	Reset	8x 01 04 03 00 FF	Manual Control of R Gain
	Up	8x 01 04 03 02 FF	
	Down	8x 01 04 03 03 FF	
	Direct	8x 01 04 43 00 00 0p 0q FF	pq: R Gain
CAM_Bgain	Reset	8x 01 04 04 00 FF	Manual Control of B Gain
	Up	8x 01 04 04 02 FF	
	Down	8x 01 04 04 03 FF	
	Direct	8x 01 04 44 00 00 0p 0q FF	pq: B Gain
CAM_AE	Full Auto	8x 01 04 39 00 FF	Automatic Exposure mode
	Manual	8x 01 04 39 03 FF	Manual Control mode
	Shutter priority	8x 01 04 39 0A FF	Shutter Priority

			Automatic Exposure mode
	Iris priority	8x 01 04 39 0B FF	Iris Priority Automatic Exposure mode
	Bright	8x 01 04 39 0D FF	Bright Mode(Manual control)
CAM_SlowShutter	AutoSlowShutterLimit	8x 01 04 2A 0p 00 FF	
CAM_Iris	Reset	8x 01 04 0B 00 FF	Iris Setting
	Up	8x 01 04 0B 02 FF	
	Down	8x 01 04 0B 03 FF	
	Direct	8x 01 04 4B 00 00 0p 0q FF	pq: Iris Position
CAM_Gain	Reset	8x 01 04 0C 00 FF	Gain Setting
	Up	8x 01 04 0C 02 FF	
	Down	8x 01 04 0C 03 FF	
	Direct	8x 01 04 0C 00 00 0p 0q FF	pq: Gain Position
	Gain Limit	8x 01 04 2C 0p FF	p: Gain Position
CAM_Bright	Reset	8x 01 04 0D 00 FF	Bright Setting

	Up	8x 01 04 0D 02 FF	
	Down	8x 01 04 0D 03 FF	
	Direct	8x 01 04 0D 00 00 0p 0q FF	pq: Bright Position
CAM_ExpComp	On	8x 01 04 3E 02 FF	Exposure Compensation On/Off
	Off	8x 01 04 3E 03 FF	
	Reset	8x 01 04 0E 00 FF	Exposure Compensation Amount Setting
	Up	8x 01 04 0E 02 FF	
	Down	8x 01 04 0E 03 FF	
	Direct	8x 01 04 4E 00 00 0p 0q FF	pq: ExpComp Position
CAM_BackLight	On	8x 01 04 33 02 FF	Back Light Compensation On/Off
	Off	8x 01 04 33 03 FF	
CAM_NR(2D)Mode	Auto	8x 01 04 50 02 FF	ND2D Auto/Manual
	Manual	8x 01 04 50 03 FF	
CAM_NR(2D)Level	--	8x 01 04 53 0p FF	p: NR Setting (0: Off, level 1 to 5)
CAM_NR(3D)Level	--	8x 01 04 54 0p FF	p: NR Setting (0:

			Off, level 1 to 8)
CAM_Flicker	--	8x 01 04 23 0p FF	p: Flicker Settings (0: Off, 1: 50Hz, 2: 60Hz)
CAM_DHotPixel	--	8x 01 04 56 0p FF	p: Dynamic Hot Pixel Setting (0: 0ff, level 1 to 6)
CAM_Aperture Mode(sharpnes s)	Auto	8x 01 04 05 02 FF	Sharpness Auto
	Manual	8x 01 04 05 02 FF	Sharpness Manual
CAM_Aperture(sharpness)	Reset	8x 01 04 02 00 FF	Aperture Control
	Up	8x 01 04 02 02 FF	
	Down	8x 01 04 02 03 FF	
	Direct	8x 01 04 42 00 00 0p 0q FF	pq: Aperture Gain
CAM_PictureEff ect	Off	8x 01 04 63 00 FF	Picture Effect Setting
	B&W	8x 01 04 63 04 FF	
CAM_Memory	Reset	8x 01 04 3F 00 pp FF	pp: Memory Number(=0 to 127)
	Set	8x 01 04 3F 01 pp FF	

	Recall	8x 01 04 3F 02 pp FF	
CAM_LR_Reverse	On	8x 01 04 61 02 FF	Image Flip Horizontal On/Off
	Off	8x 01 04 61 03 FF	
CAM_PictureFlip	On	8x 01 04 66 02 FF	Image Flip Vertical On/Off
	Off	8x 01 04 66 03 FF	
CAM_RegisterValue	--	8x 01 04 24 mn 0p 0q FF	mm: Register No. (=00-7F) pp: Register Value (=00-7F)
CAM_ColorGain	Diret	8x 01 04 49 00 00 00 0p FF	p: Color Gain setting 0h (60%) to Eh (200%)
SYS_Menu	Off	8x 01 06 06 03 FF	Turns off the menu screen
Pan_tiltDrive	Up	8x 01 06 01 VV WW 03 01 FF	VV: Pan speed 0x01 (low speed) to 0x18 (high speed) WW: Tilt speed 0x01
	Down	8x 01 06 01 VV WW 03 02 FF	
	Left	8x 01 06 01 VV WW 01 03 FF	

	Right	8x 01 06 01 VV WW 02 03 FF	(low speed) to 0x14 (high speed) YYYY: Pan Position ZZZZ: Tilt Position
	Upleft	8x 01 06 01 VV WW 01 01 FF	
	Upright	8x 01 06 01 VV WW 02 01 FF	
	DownLeft	8x 01 06 01 VV WW 01 02 FF	
	DownRight	8x 01 06 01 VV WW 02 02 FF	
	Stop	8x 01 06 01 VV WW 03 03 FF	
	AbsolutePosition	8x 01 06 02 VV WW 0Y 0Y 0Y 0Y 0Z 0Z 0Z 0Z FF	
	RelativePosition	8x 01 06 03 VV WW 0Y 0Y 0Y 0Y 0Z 0Z 0Z 0Z FF	
	Home	8x 01 06 04 FF	
	Reset	8x 01 06 05 FF	
Pan_tiltLimitSet	LimitSet	8x 01 06 07 00 0W 0Y 0Y 0Y 0Y 0Z 0Z 0Z 0Z FF	W: 1 UpRight 0: DownLeft

	LimitClear	8x 01 06 07 01 0W 07 0F 0F 0F 07 0F 0F 0F FF	YYYY: Pan Limit Position ZZZZ:Tilt Position
CAM_AFSensitivity	High	8x 01 04 58 01 FF	AF Sensitivity High/Normal/Low
	Normal	8x 01 04 58 02 FF	
	Low	8x 01 04 58 03 FF	
CAM_SettingReset	Reset	8x 01 04 A0 10 FF	Reset Factory Setting
CAM_Brightness	Direct	8x 01 04 A1 00 00 0p 0q FF	pq: Brightness Position
CAM_Contrast	Direct	8x 01 04 A2 00 00 0p 0q FF	pq: Contrast Position
CAM_Flip	Off	8x 01 04 A4 00 FF	Single Command For Video Flip
	Flip-H	8x 01 04 A4 01 FF	
	Flip-V	8x 01 04 A4 02 FF	
	Flip-HV	8x 01 04 A4 03 FF	
CAM_SettingSave	Save	8x 01 04 A5 10 FF	Save Current Setting
CAM_Iridix	Direct	8x 01 04 A7 00 00 0p 0q FF	pq: Iridix Position

CAM_AWBSensitivity	High	8x 01 04 A9 00 FF	High
	Normal	8x 01 04 A9 01 FF	Normal
	Low	8x 01 04 A9 02 FF	Low
CAM_AFZone	Top	8x 01 04 AA 00 FF	AF Zone weight select
	Center	8x 01 04 AA 01 FF	
	Bottom	8x 01 04 AA 02 FF	
CAM_ColorHue	Direct	8x 01 04 4F 00 00 00 0p FF	p: Color Hue setting 0h (− 14 dgrees) to Eh (+14 degrees

10.3. Query Command

Inquiry Command List			
Command	**Command packed**	**Inquiry Packet**	**Comments**
CAM_PowerInq	8x 09 04 00 FF	y0 50 02 FF	On
		y0 50 03 FF	Off(Standby)
		y0 50 04 FF	Internal power ciruit error
CAM_ZoomPosInq	8x 09 04 47 FF	y0 50 0p 0q 0r 0s FF	pqrs: Zoom Position
CAM_FocusAFModeInq	8x 09 04 38 FF	y0 50 02 FF	Auto Focus

		y0 50 03 FF	Manual Focus
CAM_FocusPosInq	8x 09 04 48 FF	y0 50 0p 0q 0r 0s FF	pqrs: Focus Position
CAM_WBModeInq	8x 09 04 35 FF	y0 50 00 FF	Auto
		y0 50 01 FF	Indoor mode
		y0 50 02 FF	Outdoor mode
		y0 50 03 FF	OnePush mode
		y0 50 05 FF	Manual
CAM_RGainInq	8x 09 04 43 FF	y0 50 00 00 0p 0q FF	pq: R Gain
CAM_BGainInq	8x 09 04 44 FF	y0 50 00 00 0p 0q FF	pq: B Gain
CAM_AEModeInq	8x 09 04 39 FF	y0 50 00 FF	Full Auto
		y0 50 03 FF	Manual
		y0 50 0A FF	Shutter priority
		y0 50 0B FF	Iris priority
		y0 50 0D FF	Bright
CAM_ShutterPosInq	8x 09 04 4A FF	y0 50 00 00 0p 0q FF	pq: Shutter Position

CAM_IrisPosInq	8x 09 04 4B FF	y0 50 00 00 0p 0q FF	pq: Iris Position
CAM_BrightPosInq	8x 09 04 4D FF	y0 50 00 00 0p 0q FF	pq: Bright Position
CAM_ExpCompModeInq	8x 09 04 3E FF	y0 50 02 FF	On
		y0 50 03 FF	Off
CAM_ExpCompPosInq	8x 09 04 4E FF	y0 50 00 00 0p 0q FF	pq: ExpComp Position
CAM_BacklightModeInq	8x 09 04 33 FF	y0 50 02 FF	On
		y0 50 03 FF	Off
CAM_Nosise2DModeIng	8x 09 04 50 FF	y0 50 02 FF	Auto Noise 2D
		y0 50 03 FF	Manual Noise 3D
CAM_Nosise2DLevel	8x 09 04 53 FF	y0 50 0p FF	Noise Reduction (2D) p: 0 to 5
CAM_Noise3DLevel	8x 09 04 54 FF	y0 50 0p FF	Noise Reduction (3D) p: 0 to 8
CAM_FlickerModeInq	8x 09 04 55 FF	y0 50 0p FF	p: Flicker Settings(0: OFF, 1: 50Hz, 2: 60Hz)
CAM_ApertureModeInq(Sharpness)	8x 09 04 05 FF	y0 50 02 FF	Auto Sharpness
		y0 50 03 FF	Manual Sharpness

CAM_ApertureInq(Sharpness)	8x 09 04 42 FF	y0 50 00 00 0p 0q FF	pq: Aperture Gain
CAM_PictureEffectModeInq	8x 09 04 63 FF	y0 50 02 FF	Off
		y0 50 04 FF	B&W
CAM_MemoryInq	8x 09 04 3F FF	y0 50 0p FF	p: Memory number last operated.
SYS_MenuModeInq	8x 09 06 06 FF	y0 50 02 FF	On
		y0 50 03 FF	Off
CAM_LR_ReverseInq	8x 09 04 61 FF	y0 50 02 FF	On
		y0 50 03 FF	Off
CAM_PictureFlipInq	8x 09 04 66 FF	y0 50 02 FF	On
		y0 50 03 FF	Off
CAM_RegisterValueInq	8x 09 04 24 mm FF	y0 50 0p 0p ff	mm: Register No. (00 to FF) pp: Register Value (00 to FF)
CAM_ColorGainInq	8x 09 04 49 FF	y0 50 00 00 00 0p FF	p: Color Gain setting 0h (60%) to Eh (200%)
CAM_IDInq	8x 09 04 22 FF	y0 50 0p 0q 0r 0s FF	pqrs: Camera ID

CAM_VersionInq	8x 09 00 02 FF	y0 50 ab cd mn pq rs tu vw FF	ab: Factory Code(00: VHD, 01:MR, 08:T) cd: Hardware Version mnpq: ARM Version rstu: FPGA Version vw: Camera model 01: C Type 02: M Type 03: S Type
VideoSystemInq	8x 09 06 23 FF	y0 50 00 FF	1920x1080i60
		y0 50 01 FF	1920x1080p30
		y0 50 02 FF	1280x720p60
		y0 50 04 FF	NTSC
		y0 50 05 FF	NTSC
		y0 50 06 FF	NTSC
		y0 50 07 FF	1920x1080p60
		y0 50 08 FF	1920x1080i50
		y0 50 09 FF	1920x1080p25
		y0 50 0A FF	1280x720p50

		y0 50 0C FF	PAL
		y0 50 0D FF	PAL
		y0 50 0E FF	PAL
IR_Receive	8x 09 06 08 FF	y0 50 02 FF	On
		y0 50 03 FF	Off
Pan-tiltMaxSpeedInq	8x 09 06 11 FF	y0 50 ww zz FF	ww: Pan Max Speed zz: Tilt Max Speed
Pan-tiltPosInq	8x 09 06 12 FF	y0 50 0w 0w 0w 0w 0z 0z 0z 0z FF	wwww: Pan Position zzzz: Tilt Position
CAM_TypeInq	8x 09 00 03 FF	y0 50 01 FF	C Type
		y0 50 02 FF	M Type
		y0 50 03 FF	S Type
CAM_DateInq	8x 09 00 04 FF	y0 50 0r ss uu uu vv ww 0D FF	Version dater: Big Version Numberss: Little Version Numberuuuu: Yearvv: Monthww: Day
CAM_ModeInq	8x 09 04 A6 FF	y0 50 00 FF	Mode0

		y0 50 02 FF	Mode2
CAM_GainLimitInq	8x 09 04 2C FF	y0 50 0q FF	p: Gain Limit
CAM_DHotPixelInq	8x 09 04 56 FF	y0 50 0q FF	p: Dynamic Hot Pixel Setting (0: 0ff, level 1 to 6)
CAM_AFSensitivityInq	8x 09 04 58 FF	y0 50 01 FF	High
		y0 50 02 FF	Normal
		y0 50 03 FF	Low
CAM_BrightnessInq	8x 09 04 A1 FF	y0 50 00 00 0p 0q FF	pq: Brightness Position
CAM_ContrastInq	8x 09 04 A2 FF	y0 50 00 00 0p 0q FF	pq: Contrast Position
CAM_FlipInq	8x 09 04 A4 FF	y0 50 00 FF	Off
		y0 50 01 FF	Flip-H
		y0 50 02 FF	Flip-V
		y0 50 03 FF	Flip-HV
CAM_IridixInq	8x 09 04 A7 FF	y0 50 00 00 0p 0q FF	pq: Iridix Position
CAM_AFZone	8x 09 04 AA FF	y0 50 00 FF	Top
		y0 50 01 FF	Center

Command	Command Packed	Inquiry Packet	Comments
		y0 50 02 FF	Bottom
CAM_ColorHueInq	8x 09 04 4F FF	y0 50 00 00 00 0p FF	p: Color Hue setting 0h (–14 dgrees) to Eh (+14 degrees
CAM_AWBSensitivit yInq	8x 09 04 A9 FF	y0 50 00 FF	High
		y0 50 01 FF	Normal
		y0 50 02 FF	Low

10.4. Block Inquiry Command List

Block Inquiry Command List			
Command	**Command Packed**	**Inquiry Packet**	**Comments**
CAM_LensBlockInq	8x 09 7E 7E 00 FF	y0 50 0u 0u 0u 0u 00 00 0v 0v 0v 0v 00 0w 00 FF	uuuu: Zoom Position vvvv: Focus Position w.bit0: Focus Mode 1: Auto 0: Manual
CAM_CameraBlockIn q	8x 09 7E 7E 01 FF	y0 50 0p 0p 0q 0q 0r 0s tt 0u vv ww 00 xx 0z FF	pp: R_Gain qq: B_Gain r: WB Mode s: Aperture tt: AE Mode u.bit2: Back Light

			u.bit1: Exposure Comp. vv: Shutter Position ww: Iris Position xx: Bright Position z: Exposure Comp. Position
CAM_OtherBlockInq	8x 09 7E 7E 02 FF	y0 50 0p 0q 00 0r 00 00 00 00 00 00 00 00 00 FF	p.bit0: Power 1:On, 0:Off q.bit2: LR Reverse 1:On, 0:Off r.bit3~0: Picture Effect Mode

| CAM_EnlargementBlockInq | 8x 09 7E 7E 03 FF | y0 50 00 00 00 00 00 00 00 0p 0q rr 0s 0t 0u FF | p: AF sensitivity q.bit0: Picture flip(1:On, 0:Off) rr.bit6~3: Color Gain(0h(60%) to Eh(200%)) s: Flip(0: Off, 1:Flip-H, 2:Flip-V, 3:Flip-HV) t.bit2~0: NR2D Level u: Gain Limit |

Note:
The [x] in the above table is the camera address, [y] = [x + 8].

11. Dimensions
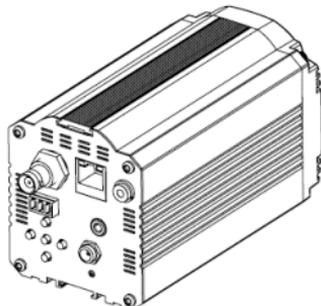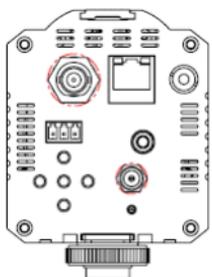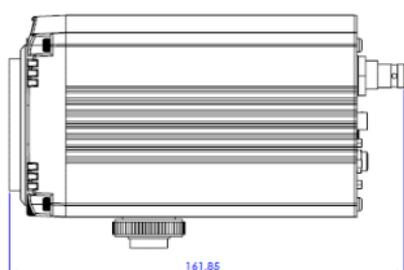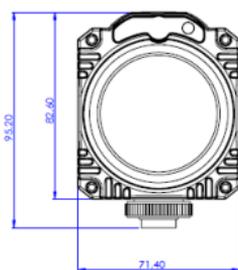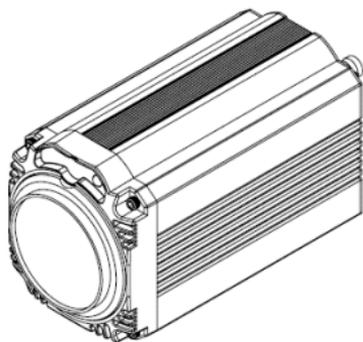
All measurements in millimeters (mm)

12. Specifications

Video	
Image Pickup Element	1/2.7" CMOS Sensor
Effective Picture Elements	Approx. 2.07 Mega pixels
Signal System	HD: 1080p60/50/30/25 1080i60/50/ 720p60/50/
Scanning Mode	Progressive
Lens	
Lens Type	20x Optical Zoom, f = 4.42 mm (WIDE) to 88.5 mm (TELE) F1.8 to F2.8
Digital Zoom	16x (optional)
Angle of View (Horizontal)	60.7 degrees (WIDE END) to 3.36 degrees (TELE END)

Angle of View (Vertical)	34.1 degrees to 1.89 degrees
Min. Illumination	0.05 Lux @ (F1.8, AGC ON)
Shutter	1/30s ~ 1/10000s
White Balance	Auto, 3000K/Indoor, 4000K, 5000K/Outdoor, 6500K_1, 6500K_2, 6500K_3, One Push, Manual
Day-Night Mode	IR cut filter with auto switch
Digital Noise Reduction	2D,3D digital noise reduction
Backlight Compensation	Supported
Power over Ethernet	Supported(optional)
IP Camera Features	
Video Compression Format	H.265/H.264/MJEPG
Video Stream	first stream & second stream
First Stream Resolution	1920x1080, 1280x720, 1024x576, 960x540, 640x480, 640x360

Second Stream Resolution	50Hz:
	1280x720, 1024x576, 720x576, 720x408, 640x360, 480x270, 320x240
	60Hz:
	1280x720, 1024x576, 720x480, 720x408, 640x360, 480x270, 320x240
Video Bit Rate	32Kbps ~ 20480Kbps
Bit Rate Type	Variable Rate, Fixed Rate
Frame Rate	50Hz: 1fps ~ 50fps
	60Hz: 1fps ~ 60fps
Audio Compression Format	AAC
Audio Bit Rate	96Kbps, 128Kbps, 256Kbps
Protocols Supported	TCP/IP, HTTP, RTSP, RTMP, Onvif, DHCP, Multicast, etc.
Control/Input & Output Interface	
HD Output	1x3G-SDI: BNC type, 800mVp-p, 75Ω, Along to SMPTE 424M standard

Network Interface	1xRJ45:10M/100M adaptive Ethernet ports
Audio interface	1x-ch 3.5mm audio interface, Line- In
Communication interface	1xRS-485, Max. Distance: 1200m
Protocol	VISCA / Pelco-D/Pelco-P
Others	
Power Connector	DC Jack w/Lock
Reset Button	Supported
Input Voltage	DC 12V / PoE (802.3af) (optional)
Current Consumption	0.5A (Max)
Operating Temperature	-10°C ~ 40°C (14°F ~ 104°F)
Storage Temperature	-40°C ~ 60°C (-40°F ~ 140°F)
Power Consumption	6W (Max)
Ceiling Installation	Supported
Dimensions (W x H x D)	71.4mm x 95.20mm x 161.85mm (w/ tripod mount)

	71.4mm x 82.60mm x 161.85mm (w/o tripod mount)
Net Weight	0.706Kg (w/ tripod mount)

Service & Support

It is our goal to make your products ownership a satisfying experience. Our supporting staff is available to assist you in setting up and operating your system. Please refer to our web site www.datavideo.com for answers to common questions, support requests or contact your local office below.

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Jun-27.2017