

# VADDIO™ CLEARVIEW™ HD-20

## High Definition PTZ Camera

Model Number 999-6950-000 (North America)

Model Number 999-6950-001 (International)



Inside Front Cover - Blank

### Overview:

The Vaddio ClearVIEW HD-20 high definition integrated robotic PTZ camera features a 20X optical zoom lens and is built around a 6.49mm diagonal (1/2.8 Type) high-speed CMOS image sensor with a total of 3.27M pixels for truly precise and clean HD video image acquisition.

Up to now, CMOS image sensors were light hungry and less clear than CCD image sensor technology. But in order to get a 1920x1080 high definition signal out of the CCD sensor, extra signal processing and scaling was required to produce signals at those resolutions. Using an increased pixel aperture size, high frame rate, high signal to noise, column-parallel A/D conversion method, the resolution, saturation and the sensitivity of the sensor are increased. The HD-20 achieves improved picture quality even in low light environments requiring a minimum illumination of just 1.6 LUX.



The HD-20 is smaller and more compact than the preceding ClearVIEW HD-18, and as important aside, the HD-20, does not replace the HD-18, but instead complements it, adding to the breadth and depth of the Vaddio camera product line. Significant improvements include a 20X, 11-element glass, motorized zoom lens, slip-clutch system and the new rugged platinum-metallic silver color.

Pan range is +170 to -170 degrees, and Tilt range is -30 to +90 degrees. The camera is also invertible for ceiling-mount applications. A variety of accessories are available, allowing the camera to be installed in a variety of projects

The HD-20 outputs HD video in both analog component (YPbPr) and HDMI formats in resolutions of 1080/60i, 1080/50i, 720/60p, 720/50p 1080/30p and 1080/25p. The HD-20 is an exceptional camera for a wide range of HD video applications such as houses of worship, corporate boardrooms, live events and distance-learning.

### Intended Use:

Before operating the device, please read the entire manual thoroughly. The system was designed, built and tested for use indoors, and with the provided power supply and cabling. The use of a power supply other than the one provided or outdoor operation has not been tested and could damage the device and/or create a potentially unsafe operating condition.

### Important Safeguards:

Read and understand all instructions before using. Do not operate any device if it has been dropped or damaged. In this case, a Vaddio technician must examine the product before operating. To reduce the risk of electric shock, do not immerse in water or other liquids and avoid extremely humid conditions.



**Use only the power supply provided with the system. Use of any unauthorized power supply will void any and all warranties.**



Please do not use "pass-thru" type RJ-45 connectors. These pass-thru type connectors do not work well for professional installations and can be the cause of intermittent connections which can result in the RS-232 control line failing and locking up, and/or compromising the HSDS™ signals. For best results please use standard RJ-45 connectors and test all cables for proper pin-outs prior to use and connection to Vaddio product.

### Save These Instructions:

The information contained in this manual will help you install and operate your product. If these instructions are misplaced, Vaddio keeps copies of Specifications, Installation and User Guides and most pertinent product drawings for the Vaddio product line on the Vaddio website. These documents can be downloaded from [www.vaddio.com](http://www.vaddio.com) free of charge.

## Unpacking:

Carefully remove the device and all of the parts from the packaging.  
Unpack and identify the following parts in 999-6950-000:

- One (1) ClearVIEW HD-20 HD Camera
- One (1) Vaddio IR Remote Commander
- One (1) EZCamera™ Control Adapter (RJ-45 to DB-9)
- One (1) Vaddio PowerRite™ 12 VDC, 3.0 Amp Power Supply
- One (1) AC Cord Set for North America
- Documentation

(Note: The 999-6950-001 Int'l Version includes the Euro and UK power cables)

## ClearVIEW HD-20 PTZ Camera, Front View with Feature Call-outs:



### 1) Camera and Zoom Lens:

20X optical zoom lens is built around a 6.49mm diagonal (1/2.8 Type) high-speed CMOS image sensor with a total of 3.27M pixels for truly precise HD video image acquisition.

### 2) Red Tally Light:

A red tally light is illuminated when the camera receives a VISCA command from an external control system.

### 3) IR Sensors:

IR sensors are built into the front of the ClearVIEW HD-20 to receive IR signals from the IR remote control supplied with the camera.

### 4) Blue Power Light:

A Vaddio blue power light is illuminated when the camera is turned on.

## Compatible Switchers and Joystick Controllers:



**ProductionVIEW™ HD**  
(999-5600-000)



**AutoPresenter**  
(999-5675-000)



**Precision Camera Controller**  
(999-5700-000)

## ClearVIEW HD-20 PTZ Camera, Rear View with Feature Call-outs:



### 5) RS-232 IN & IR Out:

The RS-232 accepts modified VISCA protocol for camera control, as well as transmits IR signaling received by the IR receivers, which can be transmitted to third party devices.

### 6) Dip Switch Settings:

Settings for IR remote, baud rate, SD output format, and image flip can be configured on these switches. See page 5 for additional information on switch settings.

### 7) HD Video Select:

A rotary switch allows the user to choose the component HD output video resolution and format. See page 5 for additional information on switch settings.

### 8) 12 VDC Input:

Power input for the standard, ClearVIEW HD-20 camera power supply.

### 9) HDMI Output:

The HDMI output feeds out HD digital video only (no copy protect or device communication is included). SD is not supported

### 10) YPbPr Output:

Component HD video is fed through the DB-15 connector. YPbPr and HDMI signals are simultaneous. SD is not supported

### 11) EZ Power/Video Port:

This RJ-45 connector is only used with the Quick-Connect SR Interface and the Quick- Connect DVI-D/HDMI SR Interface to supply power and return HSDS video from the camera.

### 12) Slot for Optional Cards:

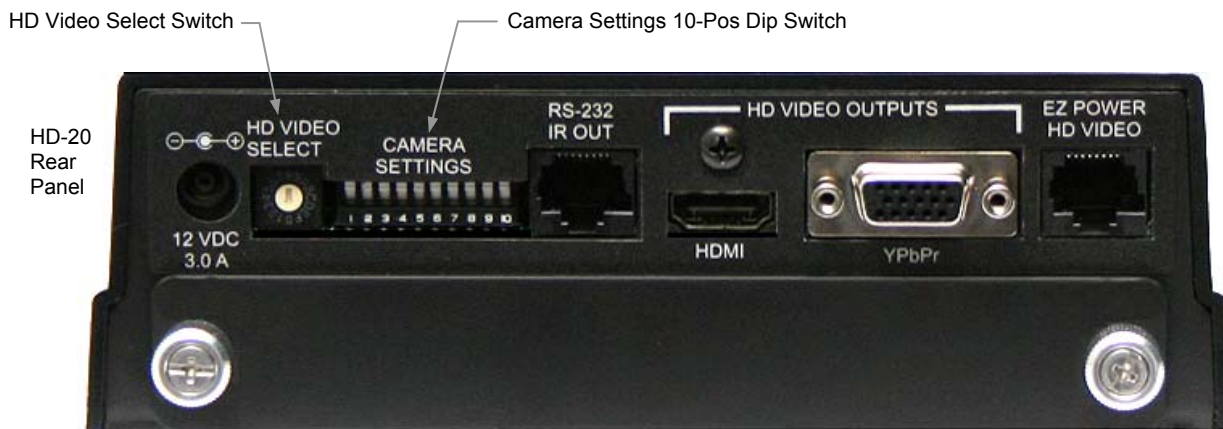
Optional slot cards can be plugged into the ClearVIEW HD-20 camera (the HD-SDI and the EZIM CCU Slot Cards are available).

### First Time Set-up with the ClearVIEW HD-20:

The ClearVIEW HD-20 was designed to be exceptionally easy to use and operate. There is documentation at the back of the manual for pin-outs for all of the connectors on the ClearVIEW HD-20 camera.

### Getting Started

**Step 1:** Using the HD Video Select Rotary Switch and Camera Settings Dip Switch on the back of the camera, set up the camera's output resolution and functional preferences. There is a label on the bottom of the camera that identifies the choices.



### Label on the Bottom of the HD-20

DIP SWITCH SETTINGS										VIDEO SELECT			
IR 1 OFF	IR 2 OFF	IR 3 OFF	IR OUT OFF	9600 bps	IMAGE FLIP OFF	HDMI COLOR YCbCr	8 OFF	9 OFF	10 OFF	0	720p/59.94	8	---
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	1	1080i/59.94	9	---
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	2	1080p/30	A	---
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	3	720p/50	B	---
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	4	1080i/50	C	---
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	5	1080p/25	D	---
IR 1 ON	IR 2 ON	IR 3 ON	IR OUT ON	38400 bps	ON	sRGB	---	---	---	6	720p/60	E	---
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	7	1080i/60	F	---
1	2	3	4	5	6	7	8	9	10				

- Set the HD output resolution for the camera with the Rotary Switch.
- Set the IR frequency of the camera if it is to respond to the IR remote control.
- If using RS-232 for control, leave the IR OUT OFF (SW4) and choose 9600bps for most applications.
- If using the IR forwarding feature, turn the IR OUT ON (SW4).
- If inverting the camera, turn the IMAGE FLIP ON (SW6).

#### Dip Switches:

**IR 1, 2 & 3:** The IR remote has the capability of operating up to three different PTZ cameras from one remote. Use the selector buttons at the top of the IR remote to select the frequency.

**IR Out 4:** The IR output is sent out on the RS-232 RJ-45 jack on the back of the camera. Turning on the IR output will allow IR signals to be transmitted over the CAT-5 cable to the head end. When using RS-232 control or Vaddio CCU controllers (also via RS-232), turn the IR OUT to OFF.

**Baud Rate 5:** The options for baud rate are either 9600 bps or 38,400 bps.

**Image Flip 6:** To invert the HD-20, turn the IMAGE FLIP ON (switch down).

**HDMI Color or sRGB Color space 7:** Default is YCbCr. Use sRGB color space with older DVI-D 1.0 monitors only. The YCbCr color space is best for HDMI digital video.

**Switches 8, 9 and 10:** Leave up - or in the OFF position

**Basic Connectivity Example of the HD-20 PTZ camera to a Vaddio Joystick Controller, Codec and Monitors:**



**Installation Basics:**

Locate the camera mounting location paying close attention to camera viewing angles, lighting conditions, possible line of site obstructions, and checking for in-wall obstructions where the camera is to be mounted. Pick a mounting location that will optimize the performance of the camera.

**RS-232 Cabling:**

For RS-232, use a standard Cat-5e cable (568B termination for RJ-45 connectors) from the RS-232 port on the back of a Vaddio ProductionVIEW camera controller or switcher. If the camera will be connected to a third-party control system (such as AMX or Crestron), a DB-9 to RJ-45 adapter is supplied with the camera for RS-232.

**Videoconferencing Codecs and RS-232:**

Depending on the codec that is used, and which RS-232 port is used with a codec, special DB-9 to RJ-45 adapters may sometimes be required. Refer to Vaddio’s website, price list or on the ClearVIEW HD-20 web page on specific diagrams for wiring the camera to videoconferencing codecs.

**Compliance and CE Declaration of Conformity - ClearVIEW HD-20**

Compliance testing was performed to the following regulations:

- |  |         |
|--|---------|
| • <b>FCC Part 15, Subpart B</b>                              | Class A |
| • <b>ICES-003, Issue 4: 2004</b>                             | Class A |
| • <b>EN 55022 A: 2006 + A1: 2007(CISPR 22:2005/A1:2005)</b>  | Class A |
| • <b>AS/NZS CISPR 22: 2009</b>                               | Class A |
| • <b>VCCI V-3/2010.04</b>                                    | Class A |
| • <b>Korean Requirements KN22: KCC Notice Number 2009-27</b> | Class A |
| • <b>EMC Directive 2004/108/EC</b>                           | Class A |

**FCC Part 15 Compliance**

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15, Subpart B, of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his/her own expense.

Operation is subject to the following two conditions: (1) This device may not cause interference, and (2) This device must accept any interference including interference that may cause undesired operation of the device.

Changes or modifications not expressly approved by Vaddio can affect emission compliance and could void the user's authority to operate this equipment.

**ICES-003 Compliance**

This digital apparatus does not exceed the Class A limits for radio noise emissions from digital apparatus set out in the Radio Interference Regulations of the Canadian Department of Communications.

Le présent appareil numérique n'émet pas de bruits radioélectriques dépassant les limites applicables aux appareils numériques de la classe A prescrites dans le Règlement sur le brouillage radioélectrique édicté par le ministère des Communications du Canada.

**European Compliance**

This product has been evaluated for Electromagnetic Compatibility under the EMC Directive for Emissions and Immunity and meets the requirements for a Class A digital device. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

**Standard(s) To Which Conformity Is Declared:**

EMC Directive 2004/108/EC

EN 55024: 1998 + Amendments A1: 2001 + A2: 2003

- EN 61000-4-2: 1995 + Amendments A1: 1998 + A2: 2001
- EN 61000-4-3: 2006 + A1: 2008
- EN 61000-4-4: 2004 + Corrigendum 2006
- EN 61000-4-5: 2006
- EN 61000-4-6: 2009
- EN 61000-4-8: 2010
- EN 61000-4-11: Second Edition: 2004

Immunity

Electrostatic Discharge

Radiated Immunity

Electrical Fast Transients

Surge Immunity

Conducted Immunity

Power Frequency Magnetic Field

Voltage Dips, Interrupts and Fluctuations

**Korean Requirements:**

- EN 61000-4-2 with KCC Notice No. 2009-27
- EN 61000-4-3 with KCC Notice No. 2009-27
- EN 61000-4-4 with KCC Notice No. 2009-27
- EN 61000-4-5 with KCC Notice No. 2009-27
- EN 61000-4-6 with KCC Notice No. 2009-27
- EN 61000-4-8 with KCC Notice No. 2009-27
- EN 61000-4-11 with KCC Notice No. 2009-27



## Warranty Information:

(See Vaddio Warranty, Service and Return Policies posted on [vaddio.com](http://vaddio.com) for complete details):

**Hardware\* Warranty:** One year limited warranty on all parts. Vaddio warrants this product against defects in materials and workmanship for a period of one year from the day of purchase from Vaddio. If Vaddio receives notice of such defects during the warranty period, they will, at their option, repair or replace products that prove to be defective. Please see Vaddio's Service Terms and Conditions at [vaddio.com](http://vaddio.com) for specific details and policies.

**Exclusions:** The above warranty shall not apply to defects resulting from: improper or inadequate maintenance by the customer, customer applied software or interfacing, unauthorized modifications or misuse, operation outside the normal environmental specifications for the product, use of the incorrect power supply, improper extension of the power supply cable or improper site operation and maintenance.

**Vaddio Customer Service:** Vaddio will test, repair, or replace the product or products without charge if the unit is under warranty and is found to be defective. If the product is out of warranty, Vaddio will test then repair the product or products. The cost of parts and labor charge will be estimated by a technician and confirmed by the customer prior to repair. All components must be returned for testing as a complete unit. Vaddio will not accept responsibility for shipment after it has left the premises.

**Vaddio Technical Support:** Vaddio technicians will determine and discuss with the customer the criteria for repair costs and/or replacement. Vaddio Technical Support can be contacted through one of the following resources: e-mail support at [support@vaddio.com](mailto:support@vaddio.com) or online at [www.vaddio.com](http://www.vaddio.com).

**Return Material Authorization (RMA) Number :** Before returning a product for repair or replacement, request an RMA from Vaddio's technical support. Provide a technician with a return phone number, e-mail address, shipping address, and product serial numbers and describe the reason for repairs or returns as well as the date of purchase and proof of purchase. Include your assigned RMA number in all correspondence with Vaddio. Write your assigned RMA number on the outside of the box when returning the product. All products returned for credit are subject to a restocking charge without exception.

**Voided Warranty:** The warranty does not apply if the original serial number has been removed or if the product has been disassembled or damaged through misuse, accident, modifications, or unauthorized repair. Cutting the power supply cable on the secondary side (low voltage side) to extend the power to the device (camera or controller) voids the warranty for that device.

**Shipping and Handling:** Vaddio will not pay for inbound shipping transportation or insurance charges or accept any responsibility for laws and ordinances from inbound transit. Vaddio will pay for outbound shipping, transportation, and insurance charges for all items under warranty but will not assume responsibility for loss and/or damage by the outbound freight carrier.

• If the return shipment appears damaged, retain the original boxes and packing material for inspection by the carrier. Contact your carrier immediately.

**Products Not Under Warranty:** Payment arrangements are required before outbound shipment for all out of warranty products.

\*Vaddio manufactures its hardware products from parts and components that are new or equivalent to new in accordance with industry standard practices.

## Other General Information:

### Care and Cleaning

Do not attempt to take this product apart at any time. There are no user-serviceable components inside.

- Do not spill liquids in the product
- Keep this device away from food and liquid
- For smears or smudges on the product, wipe with a clean, soft cloth
- Use a lens cleaner on the lens
- Do not use any abrasive chemicals.

### Operating and Storage Conditions:

Do not store or operate the device under the following conditions:

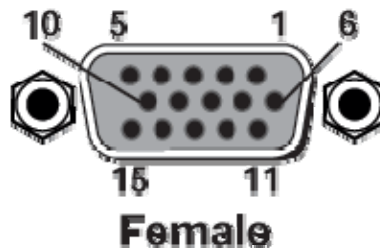
- Temperatures above 40°C (104°F) or temperatures below 0°C (32°F)
- High humidity, condensing or wet environments
- In inclement weather
- In swimming pools or bear caves
- Dry environments with an excess of static discharge
- In outer space
- Under severe vibration

### General Specifications:

ClearVIEW HD-20 HD PTZ Camera	
<b>Part Numbers</b>	ClearVIEW HD-20 999-6950-000 (North America) ClearVIEW HD-20 999-6950-001 (International)
<b>Image Device</b>	6.49mm diagonal (1/2.8 Type) Exmor High-speed CMOS Image Sensor
<b>Picture Elements</b>	3.27M pixels
<b>HD Resolutions</b>	1080i/59.94/60, 1080/50i, 720p/59.94/60, 720/50p, 1080/30p and 1080/25p (SD Resolutions not Supported)
<b>Lens</b>	20x Optical Zoom Lens with HILD™ (High Index Low Dispersion) Glass, F1.6 Wide to F3.5 Tele, 11-Elements in 9-Groups
<b>Focal Length</b>	F=4.7mm wide to 94mm tele
<b>Horizontal Viewing Angle</b>	2.9° to 55.2° - 16:9 Format
<b>Video S/N Ratio</b>	>50 dB
<b>Invertible</b>	Yes - With No Frame Delay
<b>Minimum Illumination</b>	1.6 LUX (F1.6, 50IRE)
<b>Serial Control Protocol</b>	RS-232 (Modified VISCA)
<b>Pan/Tilt Range</b>	Pan: +170 degrees to -170 degrees, Tilt: +90 degrees to -30 degrees
<b>Min. Object Distance</b>	Wide End: .01m wide end, Tele end: 1.0m
<b>Preset Positions</b>	16 (internal), 6 recalled via IR Remote
<b>Image Control</b>	Red & Blue Gain, Detail, Chroma, Gamma, Pedestal, Iris, and Gain (available through RS-232 control)
<b>Tally Light</b>	Available through RS-232 Control
<b>Connectors</b>	<ul style="list-style-type: none"> <li>• 12 VDC Power Input: EIAJ-04 Coaxial Power Connector</li> <li>• HD Video Outputs: YPbPr on DE-15 (D-Sub 15-pin HD), HDMI</li> <li>• RS-232/IR Out: RJ-45 Jack (RS-232 Communication and IR Out (with Quick-Connect -SR Interfaces)</li> <li>• EZ Power HD Video: RJ-45 Jack, for use with Quick-Connect - SR Interface or Quick-Connect DVI/HDMI - SR Interface. Supplies power to the camera and returns HD video from the camera to the Quick-Connect - SR Systems.</li> </ul>
<b>HD Video Select</b>	16-Position Rotary Switch: Used to set HD Video Resolution Output
<b>Camera Settings</b>	10-Position Dip Switch: Settings for IR Select, Baud Rate 9600, Image Flip, Unpublished Functions
<b>Accessory Slot Cards</b>	EZIM HD-SDI Slot Card PN# 998-6900-007 EZIM CCU Slot Card PN# 999-6900-006 - For Use with Quick-Connect CCU Only
General Information	
<b>Operating Temperature</b>	32° to 104° F (0° to 40° C)
<b>Power Consumption</b>	Maximum 25 watts (without accessory card)
<b>Dimensions (H x W x D)</b>	7.81" (198.37mm) x 6.67" (169.42mm) x 7.057" (179.25. mm)
<b>Weight</b>	5.6 lbs. (2.63083592 kg.)

### Appendix 1: YPbPr Video Pin-Out for the HD-20 Camera

Pin	YPbPr
1	Pr
2	Y
3	Pb
4	-
5	-
6	Pr GND
7	Y GND
8	Pb GND
9	-
10	-
11	-
12	-
13	-
14	-
15	-



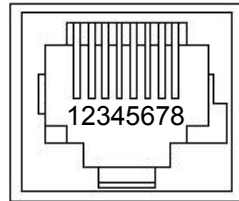


### EZCamera Power & HD Video RJ-45 Connector Pin-outs

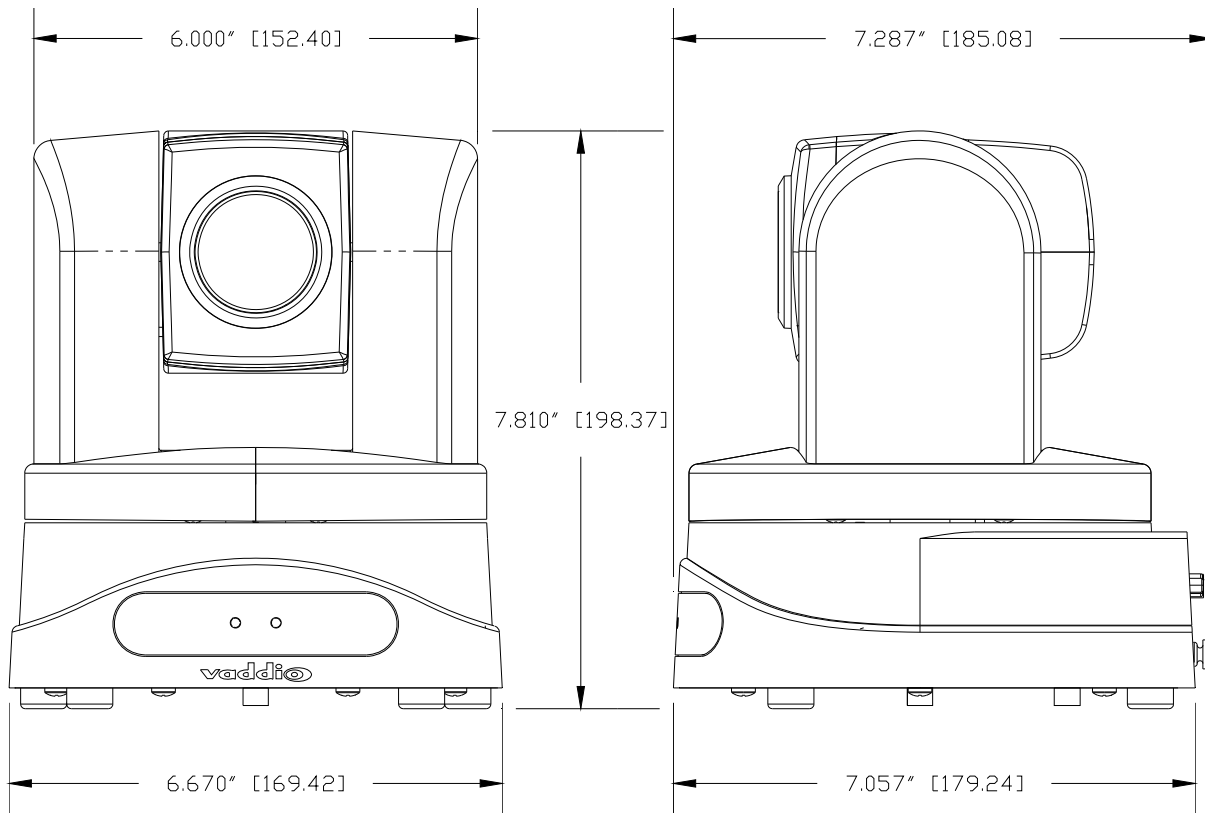
**Important Note:**

The EZCamera Power and HD Video RJ-45 Connector is for use with either the **Quick-Connect SR Interface** or the **Quick-Connect DVI/HDMI SR Interface ONLY** (568B Wiring Standard). The video signals are differential (HSDS™) and can only be received by the interfaces above.

Pin	YPbPr
1	Power+
2	Power-
3	Y+
4	PB+
5	PB GND
6	Y GND
7	PR+
8	PR-



### Appendix 2: ClearVIEW HD-20 Dimensions



### Optional Accessories:



- TANDBERG RS-232 Adapter**  
998-1002-232
- Polycom RS-232 Adapter**  
998-1003-232
- Polycom HDX 8000 Series Adapter**  
998-1006-232



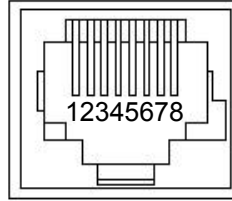
**Wall Mount Bracket**  
535-2000-230



- 15-pin to Male BNC Output Cables**
- 440-5600-001 (3 ft.)
- 440-5600-002 (6 ft.)
- 440-5600-003 (7 inch.)

### Appendix 3: Communication Specification

Communication Speed: 9600 bps (default)  
 Start bit: 1  
 Stop bit: 1  
 Data bits: 8  
 Parity: None  
 No Flow control



Pin #	RJ-45 RS-232 and IR Out Pins
1)	Unused
2)	Unused
3)	Unused
4)	IR Output (Diff Signal to Quick-Connect SR)
5)	IR Ground (Diff Signal to Quick-Connect SR)
6)	GND (GND of IR Short Range - Pin 3)
7)	RXD (from TXD of control source)
8)	TXD (to RXD of control source)

**NOTE:** The Vaddio ClearVIEW HD-20 Control Protocol is similar, but not identical to the Sony® VISCA™ command set in order to be compatible with several popular control devices. Not all VISCA commands are supported and there are many HD-20 specific commands in the following Command and Inquiry Lists.

#### HD-20 Command List (1/2)

Command Set	V	Command	Command Packet	Comments
AddressSet	Y	Broadcast	88 30 01 FF	Address Set
IF_Clear	Y	Broadcast	88 01 00 01 FF	I/F Clear
CommandCancel	Y		81 2p FF	p: Socket No(=1 to2)
CAM_Power	Y	On	81 01 04 00 02 FF	Power On/Off
	Y	Off	81 01 04 00 03 FF	
CAM_Zoom	Y	Stop	81 01 04 07 00 FF	p:0(Slow) to 7(Fast) p:0(Slow) to 7(Fast) pqrs:Zoom Pos 0x000-0x6400* V:(Speed) 0-7
	Y	Tele(Standard)	81 01 04 07 02 FF	
	Y	Wide(Standard)	81 01 04 07 03 FF	
	Y	Tele(Variable)	81 01 04 07 2p FF	
	Y	Wide(Variable)	81 01 04 07 3p FF	
	Y	Direct	81 01 04 47 0p 0q 0r 0s FF	
CAM_Focus	Y	Direct(Variable)	81 01 7E 01 4A 0V 0p 0q 0r 0s FF	Supported as 'Standard' Supported as 'Standard'  pqrs:0x000-0xC00*
	Y	Stop	81 01 04 08 00 FF	
	Y	Far(Standard)	81 01 04 08 02 FF	
	Y	Near(Standard)	81 01 04 08 03 FF	
	Y	Far(Variable)	81 01 04 08 2p FF	
	Y	Near(Variable)	81 01 04 08 3p FF	
	Y	AutoFocus	81 01 04 38 02 FF	
	Y	ManualFocus	81 01 04 38 03 FF	
CAM_WB	Y	Auto/Manual	81 01 04 38 10 FF	pqrs:0x000-0xC00*
	Y	Direct	81 01 04 48 0p 0q 0r 0sFF	
CAM_WB	Y	Auto	81 01 04 35 00 FF	
	Y	Manual	81 01 04 35 05 FF	
CAM_RGain	Y	Reset	81 01 04 03 00 FF	prq:000-0x27f
	Y	Up	81 01 04 03 02 FF	
	Y	Down	81 01 04 03 03 FF	
	Y	Direct	81 01 04 43 00 0p 0q 0rFF	
CAM_BGain	Y	Reset	8x 01 04 04 00 FF	prq:000-0x27f
	Y	Up	8x 01 04 04 02 FF	
	Y	Down	81 01 04 04 03 FF	
	Y	Direct	81 01 04 44 00 0p 0q 0rFF	
CAM_AE	Y	Full Auto	81 01 04 39 00 FF	Auto Exposure Mode Manual Control Mode Shutter Priority Mode Exposure Priority Mode (default)
	Y	Manual	81 01 04 39 03 FF	
	Y	Shutter Priority	81 01 04 39 0A FF	
	Y	Iris Priority	81 01 04 39 0B FF	
CAM_Iris	Y	Reset	81 01 04 0B 00 FF	pq:0x0-0x0B
	Y	Up	81 01 04 0B 02 FF	
	Y	Down	81 01 04 0B 03 FF	
	Y	Direct	81 01 04 4B 00 00 0p 0q FF	
CAM_Gain	Y	Reset	81 01 04 0C 00 FF	pq:0x0-0x24
	Y	Up	81 01 04 0C 02 FF	
	Y	Down	81 01 04 0C 03 FF	
	Y	Direct	81 01 04 4C 00 00 0p 0q FF	

**\*Zoom and Focus Data:**

CAM\_Zoom: Range(0x000–0x6400)

CAM\_Focus: Range (0x000-0xC000) dependent on Zoom Position

## HD-20 Command List (2/2)

Command Set	V	Command	Command Packet	Comments	
CAM_Backlight	Y	On	81 01 04 33 02 FF		
	Y	Off	81 01 04 33 03 FF		
CAM_Aperture	Y	Reset	81 01 04 02 00 FF		
	Y	Up	81 01 04 02 02 FF		
	Y	Down	81 01 04 02 03 FF		
	Y	Direct	81 01 04 42 00 00 0p 0q FF	pq:0x0-0x35	
CAM_Memory	Y	Reset	81 01 04 3F 00 0p FF	p:Memory No(=0-0xf)	
	Y	Set	81 01 04 3F 01 0p FF		
	Y	Recall	81 01 04 3F 02 0p FF		
CAM_IDWrite	Y		81 01 04 22 0p 0q 0r 0s FF	pqrs:Camera ID(==0000 – FFFF)	
IR_Receive	Y	On	81 01 06 08 02 FF		
	Y	Off	81 01 06 08 03 FF		
	Y	On/Off	81 01 06 08 10 FF		
IR_ReceiveReturn	N+	On	81 01 7D 01 03 00 00 FF		
	N+	Off	81 01 7D 01 13 00 00 FF		
Pan-tiltDrive	Y	Up	81 01 06 01 VV WW 03 01 FF	WW: Pan Speed (0x01-0x18) VV:Tilt Speed(0x01-0x14)	
	Y	Down	81 01 06 01 VV WW 03 02 FF		
	Y	Left	81 01 06 01 VV WW 01 03 FF		
	Y	Right	81 01 06 01 VV WW 02 03 FF		
	Y	UpLeft	81 01 06 01 VV WW 01 01 FF		
	Y	UpRight	81 01 06 01 VV WW 02 01 FF		
	Y	DownLeft	81 01 06 01 VV WW 01 02 FF		
	Y	DownRight	81 01 06 01 VV WW 02 02 FF		
	Y	Stop	81 01 06 01 VV WW 03 03 FF		
	Y	Absolute Position	81 01 06 02 VV WW 0Y 0Y 0Y 0Y 0Z 0Z 0Z 0Z FF 0Y 0Y 0Y 0Y 0Z 0Z 0Z 0Z FF		YYYY: Pan Position** ZZZZ: Tilt Position**
	Y	Home	81 01 06 04 FF		
	Y	Reset	81 01 06 05 FF		
Tally	Y	On	81 01 7E 01 0A 00 02 FF		
	Y	Off	81 01 7E 01 0A 00 03 FF		
Preset Pan Speed	Y	Pan/Tilt Speed	81 01 7E 01 0B WW VV ZZ FF	WW: Pan Speed (0x01-0x18) VV:Tilt Speed(0x01-0x14) ZZ:Zoom Speed(0-7);	
Motor Config	Y	Hard Motor Stops	81 01 7E 01 70 00 00 FF		
	Y	Soft Motor Stops	81 01 7E 01 70 00 01 FF		
BLK.Enhance	Y	Pedestal	81 01 7E 53 00 00 0p 0q FF	Black Level (pq:0x0-0x5F)	
GMA.Enhance	Y	Gamma	81 01 7E 54 00 00 0p 0q FF	pq:0x0-0xCF	
CRM.Enhance	Y	Chroma	81 01 7E 55 00 00 0p 0q FF	pq:0x0-0xAF	
KNE.Enhance	Y	Knee	81 01 7E 56 00 00 0p 0q FF	pq:0x0-0xFF	
CAM_Shutter	Y	Reset	81 01 04 0A 00 FF	(Only supported in Shutter Priority Mode)	
	Y	Up	81 01 04 0A 02 FF		
	Y	Down	81 01 04 0A 03 FF		
	Y	Direct	81 01 04 42 00 00 0p 0q FF		
CAM_ExpComp	Y	On	81 01 04 3E 02 FF	AutoExposure Off AutoExposure On	
	Y	Off	81 01 04 3E 03 FF		
	Y	Reset	81 01 04 0E 00 FF		
	Y	Up	81 01 04 0E 02 FF		
	Y	Down	81 01 04 0E 03 FF		
	Y	Direct	81 01 04 4C 00 00 0p 0q FF		
CAM_ICR Cut Filter	Y	ICR On	81 01 04 01 02 FF	ICR On	
	Y	ICR Off	81 01 04 01 03 FF	ICR Off	

### \*\* Additional Information:

Pan Range: 8044 – 7FBC (-32,700 to +32,700)

Tilt Range: E891 – 4C2B (-5,999 to +19,499)

Actual Pan/Tilt ranges defined in Inquiry list

## HD-20 Inquiry List (1/1)

Inquiry Command	V	Command	Command Packet	Comments
CAM_PowerInq	Y	81 09 04 00 FF	y0 50 02 FF y0 50 03 FF	On Off(Standby)
CAM_ZoomPosInq	Y	81 09 04 47 FF	y0 50 0p 0q 0r 0s FF	pqr: Zoom Position
CAM_WBModelInq	Y	81 09 04 35 FF	y0 50 00 FF y0 50 05 FF	Auto Manual
CAM_RGain	Y	81 09 04 43 FF	y0 50 00 0p 0q 0r FF	pqr:000-1ff
CAM_BGain	Y	81 09 04 44 FF	y0 50 00 0p 0q 0r FF	pqr:000-1ff
CAM_AEModelInq	Y	81 09 04 39 FF	y0 50 00 FF y0 50 03 FF	Auto Exposure Mode Manual Control Mode
CAM_Iris	Y	81 09 04 4B FF	y0 50 00 00 0p 0q FF	pq(0x00-0x11)
CAM_Gain	Y	81 09 04 4C FF	y0 50 00 00 0p 0q FF	pq(0x00-0x1E)
CAM_BacklightModelInq	Y	81 09 04 33 FF	y0 50 02 FF y0 50 03 FF	On Off
CAM_FocusPosInq	Y	81 09 04 48 FF	Y0 50 0p 0q 0r 0s FF	Pqrs:Focus Pos 0x000-0x0C000
CAM_ApertureInq	Y	81 09 04 42 FF	y0 50 00 00 0p 0q FF	pq(0x00-0x3F)
CAM_MemoryInq	Y	81 09 04 3F FF	y0 50 0p FF	p:Memory No(=0-0xf)
CAM_IDInq	Y	81 09 04 3F FF	y0 50 0p 0q 0r 0s FF	pqrs:(0000 – FFFF)
CAM_ReceiveInq	Y	81 09 06 08 FF	y0 50 02 FF y0 50 03 FF	On Off
Pan-TiltMaxSpeedInq	Y	81 09 06 11 FF	y0 50 WW VV FF	WW: Pan Speed (0x01-0x18) VV:Tilt Speed(0x01-0x14)
Pan-tiltPositionInq	Y	81 09 06 12 FF	y0 50 0Y 0Y 0Y 0Y 0Z 0Z 0Z 0Z FF	YYYY: Pan (0x0100-0x1800) ZZZZ:Tilt (0x0100-0x1400)
TallyInq	Y Y	81 09 7E 01 0A FF	y0 50 02 FF y0 50 03 FF	On Off
PresetSpeedInq	Y	81 09 7E 01 0B FF	y0 50 WW VV ZZ FF	WW: Pan Speed (0x01-0x18) VV:Tilt Speed(0x01-0x14) ZZ:Zoom Speed(0-7);
Motor Config	Y	81 09 7E 01 70 FF	y0 50 00 FF y0 50 01 FF	Hard Motor Stops Soft Motor Stops
BLK.Enhance	Y	81 01 7E 53 FF	y0 50 00 00 0p 0q FF	pq: Black Level (0x01-0xFD)
GMA.Enhance	Y	81 01 7E 54 FF	y0 50 00 00 0p 0q FF	pq: Gamma (0x00-0x8F)
CRM.Enhance	Y	81 01 7E 55 FF	y0 50 00 00 0p 0q FF	pq: Chroma (0x08-0x1F)
KNE.Enhance	Y	81 01 7E 56 FF	y0 50 00 00 0p 0q FF	pq: Knee (0x0-07F)
CAM_AEModelInq	Y	81 09 04 39 FF	y0 50 00 FF y0 50 03 FF y0 50 0A FF y0 50 0B FF y0 50 0D FF	Auto Exposure Mode Manual Control Mode Shutter Priority Mode Exposure Priority Mode AGC Priority Mode
CAM_ShutterPosInq	Y	81 09 04 4A FF	y0 50 00 00 0p 0q FF	pq: ShutterPosition (Only supported in Shutter Priority Mode)
CAM_ExpCompModelInq	Y	81 09 04 3E FF	y0 50 02 FF y0 50 03 FF	On - AE Mode Off Off – AE Mode On
CAM_ExpCompPosInq	Y	81 09 04 4E FF	y0 50 00 00 0p 0q FF	pq: ExpComp Pos -Iris Position
CAM_ICRModelInq	Y	81 09 04 01 FF	y0 50 02 FF y0 50 03 FF	ICR On ICR Off





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