

Red Line Product

**BOLiN**

**R9 Series**  
Indoor PTZ Line Flagship



**R9-420F**

**Redefining The Indoor PTZ Camera Experience**

## 4K60 Pan Tilt Zoom camera

The R9-420F indoor PTZ camera is equipped with Sony 4K sensor with 20x zoom range to provide 4K60 high-quality Ultra High-Definition image to output HDMI, 12G-SDI, Optical SDI, and 4K IP video streaming for ProAV and broadcast application.

### R9-420F

### KEY FEATURES



- Sony 4K image sensor
- 20X zoom range
- Resolution 4K60, 1080i59.94, 1080p60
- IP Video Resolution: Up to 2160p60, 1080p60
- Video Output: Simultaneous 12G-SDI, HDMI2.0, IP
- FPGA FAST HEVC Ultra Low Latency
- SFP Optical SDI video output
- RTSP, RTMP, SRT Supported
- Visca Over IP, Onvif, FreeD, Serial Control Supported



### IMAGE MODULE

- R9-420F 4K60 PTZ Camera is equipped with Sony image sensor IMX715, and 8M ultra high resolution 20X optical lens, integrated with AI based algorithm ISP this image module delivers high quality and clean noiseless high speed 60fps UHD color image.
- The camera produces brilliant broadcast-quality color images in 4K60 and Full HD with excellent low-light sensitivity.
- 1/2.8 Inch CMX715 High Class Sensor
- Cristal 20X High Resolution optical zooms
- AI Face Detection Auto Focus/Exposure
- Super WDR
- Color Matrix
- Gamma Level

# FEATURES

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## R9-420F Output Interface

|                               |                                  |                               |                   |
|-------------------------------|----------------------------------|-------------------------------|-------------------|
| Dual 12G-SDI                  | HDMI 2.0                         | SFP Optical SDI               | Genlock           |
| 4K IP Streaming               | AVC/HEVC                         | RTSP, RTMP, RTMPS, SRT        | True Dual-Output  |
| All Video with Audio Embedded | XLR Broadcast Audio Input/Output | On-screen Character Generator | Serial/IP Control |
| High-Quality                  | Low Latency                      | Low Bandwidth                 | Power Output      |

## Full Broadcast SDI Format and Standard

### Full Format

3840 x 2160P 60/59.94/50/30/29.97/25/24/23.98

1920 x 1080P 60/59.94/50/30/29.97/25/24/23.98

1920 x 1080i 60/59.94/50

1280 x 720P 60/59.94/50

### SDI Standard

SMPTE 292M

SMPTE 296M (1.5Gb/s)

SMPTE 424M

SMPTE 274M

SMPTE 425-A (3Gb/s)

SMPTE 2081(6Gb/s)

SMPTE 2082-1(12Gb/s)

With SMPTE352 SDI Metadata Supported

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- |                                                                                                                                                  |                                                                                                                                                                                                                                                        |
|--------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"><li>▪ Dual 12G-SDI</li><li>▪ HDMI 2.0</li><li>▪ 4K IP Streaming - AVC/HEVC</li><li>▪ SFP Optical SDI</li></ul> | <ul style="list-style-type: none"><li>▪ External Synchronization Genlock</li><li>▪ Audio embedded with all video output</li><li>▪ XLR broadcast audio input/output</li><li>▪ On-screen character generator</li><li>▪ Lifting Handle built-in</li></ul> |
|--------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

# FEATURES

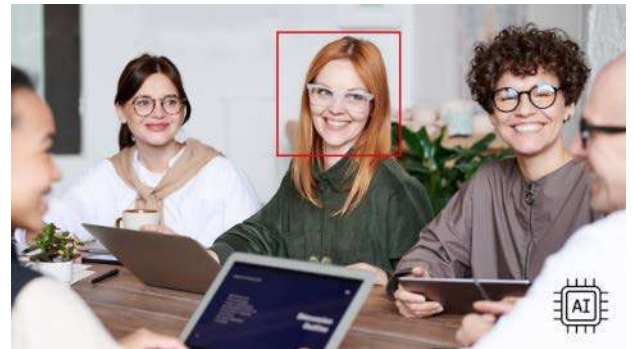
## FreeD Protocol Integrated for VR/AR Video Production

FreeD helps provide all the axis data needed for a Bolin PTZ camera to intelligently and smoothly pan, tilt, and zoom while following designated objects and people. Broadcasters can combine Bolin's FreeD-enabled PTZ cameras with available, sophisticated software to automate complex camera operations with spectacular results. It is especially useful for virtual live video productions with baseband video feeds and, with Bolin PTZ cameras, with ultra-low latency AV Over IP streaming



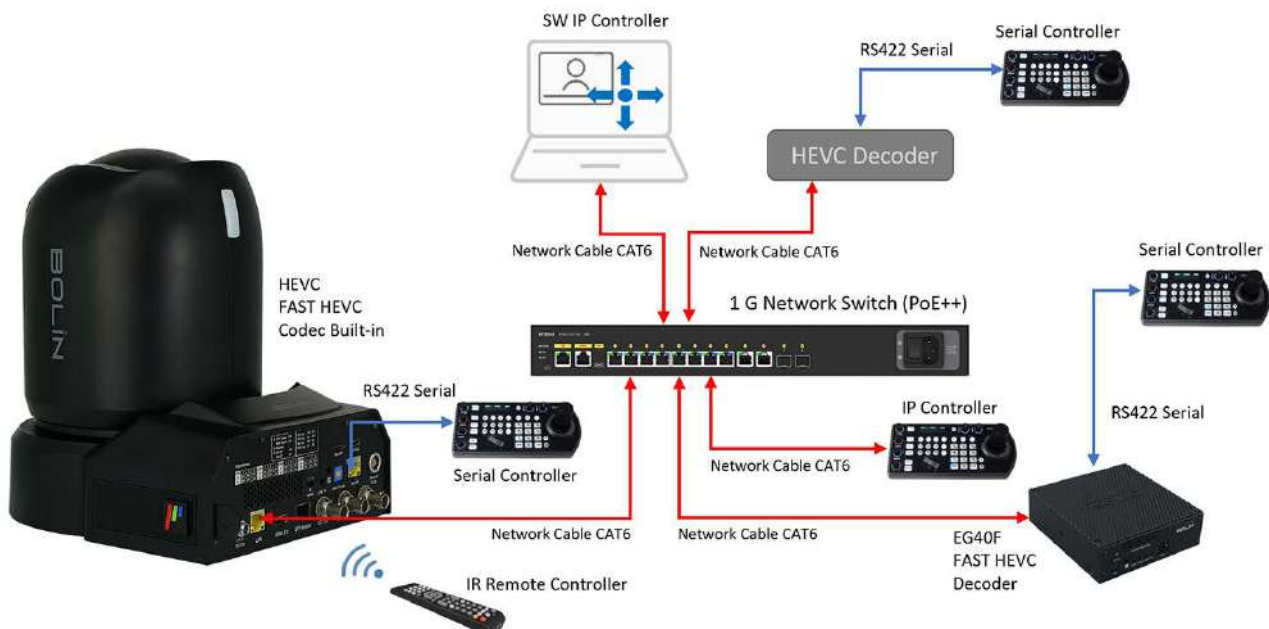
## AI Powered Auto Focus and Auto Exposure

Built with Bolin's latest AI-powered facial analytics engine, which enables smart focus and smart exposure to provide faster, more precise focusing and improved auto exposure on faces in complex lighting environments.

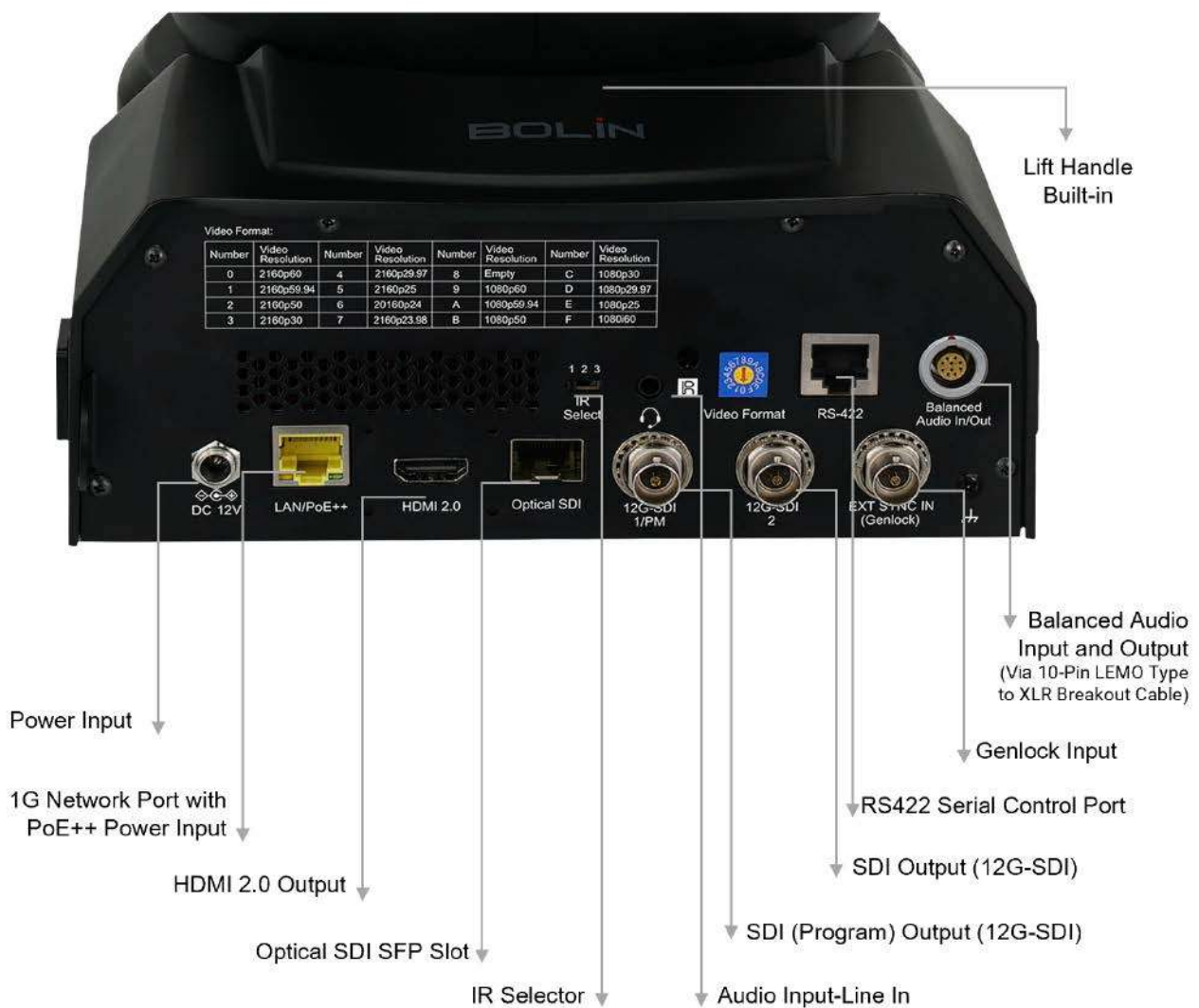


## Various Control Methods

- IP Control, Serial Control, IR Remote Control, Rest API-Software Control
- Protocol Supported: VISCA Over IP, ONVIF, VISCA, PELCO P/D, FreeD

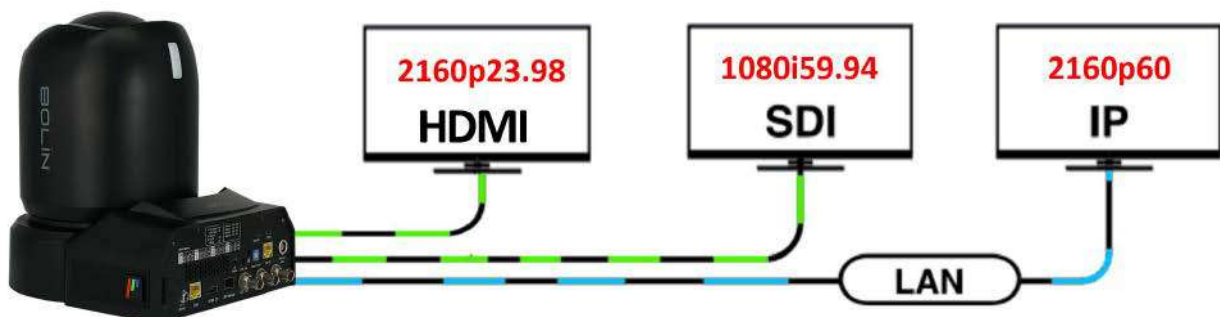


# OUTPUT



## True Tri-Output

Simultaneously output SDI, HDMI, and IP, which can be set to independent formats for different application use. (The image shows video format model specific)





## FAST HEVC

High Quality  
Low Bandwidth  
Low Latency

- Up to 4K60
- Dual stream, Multicast Support
- RTSP, RTMP, RTMPS, SRT, ONVIF
- IP Control protocol: Visca Over IP, Onvif
- Compatible With Standard AVC/HEVC
- Software Decode and Hardware Decode
- H.264/265 open platform, codec from AMD/Xilinx MPSoC

*FAST AVC/HEVC, FPGA hardware codec,  
Utilizing AMD/Xilinx MPSoC to deliver*

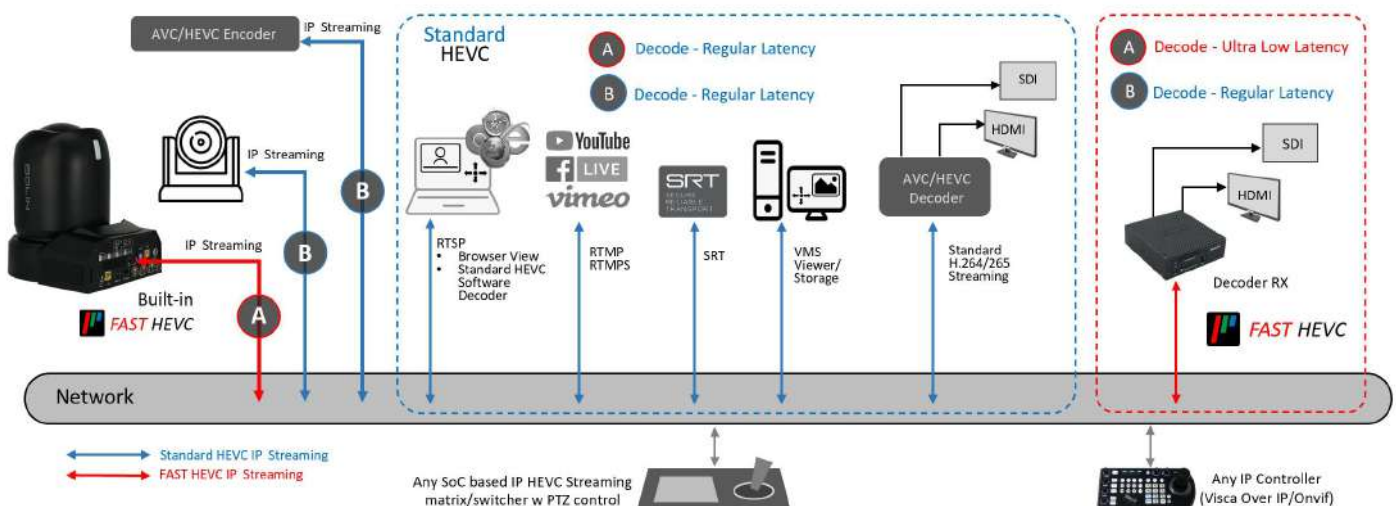
*Only **45Mbps** bandwidth that streaming **4K60** at 4:2:2 12bit  
in less than **2 frame/s (32ms)** latency*

### Comparison-The Facts of FAST HEVC Performance\*

| Foundation         | Platform      | Codec      | 1080p59.94/60     |                          |           | 2160p59.94/60     |                          |           |
|--------------------|---------------|------------|-------------------|--------------------------|-----------|-------------------|--------------------------|-----------|
|                    |               |            | Quality (Up To)   | Latency (Point-to Point) | Bandwidth | Quality (Up To)   | Latency (Point-to Point) | Bandwidth |
| H.264/265 AVC/HEVC | Software SOC  | Stand HEVC | 420SP(NV12)       | 4 frame/70ms             | 8Mbps     | 420SP(NV12)       | 25 frame/430ms           | 16Mbps    |
|                    | Hardware SOC  | Stand HEVC | 4:2:2/12bit       | 2 frame/30ms             | 8Mbps     | NA                |                          |           |
|                    | Hardware FPGA | FAST HEVC  | 4:2:2/12bit(NV16) | 2 frame/25ms             | 8-30Mbps  | 4:2:2/12bit(NV16) | 2 frame/30ms             | 16-65Mbps |
| NDI                | Hardware FPGA | Full NDI   | 4:2:2/10bit       | 3 frame/50ms             | 150Mbps   | 4:2:2/10bit       | 4 frame/70ms             | 300Mbps   |
| Dante AV-Ultra     | Hardware FPGA | JPEG 2K    | 4:2:2/12bit       | 1 frame/6ms              | 250Mbps   | 4:2:2/12bit       | 1 frame/8ms              | 550Mbps   |

\*Results may vary depending on network configuration and management settings.

### Open Platform



Bolin FAST HEVC codec camera can be decoded by standard HEVC decoder but will not have Ultra Low Latency

HEVC codec camera/device can be decoded by Bolin FAST HEVC decoder but will not have Ultra Low Latency



# MOVEMENT

## Smooth and Accurate Movement

- PAN: 340° (-170° to +170°); Fully proportional speed 0.01° to 100°/s
- TILT: 120° (-30° to +90°); Fully proportional speed 0.01° to 50°/s
- Preset: 255 positions, Speed 100°/s, 0~5 Level Adjustable, Accuracy: 0.03°
- Picture Profile Preset
- Motionless Preset
- PTZ Trace Memory
- Quiet - Less than NC35



## FEATURES

- On-screen character generator
- All firmware upgrade via IP
- Front and Rear Tally Light
- POE++ and 12VDC/AC
- Built-in handle
- Genlock
- HDMI cable secure mount
- Available Color: Black, White



## Move, with you

- Industry-First unique portable body design
- Facilitates your video production installation.

## Move • With You



# SPECIFICATIONS

|                            |                                                                                                                                                                                                                                                   |
|----------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Model Number</b>        | <b>R9-420F</b>                                                                                                                                                                                                                                    |
| <b>Codec</b>               |  <b>FAST HEVC</b>                                                                                                                                                |
| <b>Camera Image</b>        | <b>20X 4K60</b>                                                                                                                                                                                                                                   |
| Image Maker                | Bolin                                                                                                                                                                                                                                             |
| Image Sensor               | IMX715, CMOS image sensor 1/2.8 type                                                                                                                                                                                                              |
| Number of effective pixels | 8.29MP, 8.29 MP                                                                                                                                                                                                                                   |
| Picture elements           | 3840x2160                                                                                                                                                                                                                                         |
| Lens                       | 20X                                                                                                                                                                                                                                               |
| Tele Convert Mode          | -                                                                                                                                                                                                                                                 |
| Digital Zoom               | 16X                                                                                                                                                                                                                                               |
| Horizontal Angle of View   | 78.59° (W)~4.92° (T)                                                                                                                                                                                                                              |
| Vertical Angle of View     | 48.39° (W)~2.79° (T)                                                                                                                                                                                                                              |
| Focal Length               | f= 3.55 mm (WIDE) to 63.58 mm (TELE)                                                                                                                                                                                                              |
| Min. object distance       | 50cm                                                                                                                                                                                                                                              |
| Aperture                   | F2.0 (Wide) to F3.8 (Tele)                                                                                                                                                                                                                        |
| Min. Illumination          | 0.5lux (color) , 0.1lux (black)                                                                                                                                                                                                                   |
| Shutter Speed              | 1/1 sec to 1/10000 sec (22 steps)                                                                                                                                                                                                                 |
| Focus                      | Auto, Push, Manual                                                                                                                                                                                                                                |
| White Balance              | Auto, Indoor, Outdoor, OPW, ATW, Manual                                                                                                                                                                                                           |
| Exposure                   | Auto, Manual, Shutter /Iris /Brightness priority                                                                                                                                                                                                  |
| Features                   | Backlight Compensation, E-FLIP, Mirror, Day/Night, Flicker ,Contrast, Effect, SHARPNESS                                                                                                                                                           |
| WDR                        | 120db                                                                                                                                                                                                                                             |
| ND Filter                  | -                                                                                                                                                                                                                                                 |
| Image Stabilizer           | Yes                                                                                                                                                                                                                                               |
| Color Gain                 | Yes                                                                                                                                                                                                                                               |
| Color Hue                  | Yes                                                                                                                                                                                                                                               |
| Gamma                      | Yes                                                                                                                                                                                                                                               |
| Gamma Level                | 0-4                                                                                                                                                                                                                                               |
| Color Matrix               | Yes                                                                                                                                                                                                                                               |
| Noise Reduction            | On/Off (level 5 to 1 / Off, 6 steps), 3D / 2D                                                                                                                                                                                                     |
| S/N Ratio                  | ≥50db                                                                                                                                                                                                                                             |
| E-Flip                     | Yes                                                                                                                                                                                                                                               |
| Defog                      | Yes                                                                                                                                                                                                                                               |
| High Sensitivity           | Yes                                                                                                                                                                                                                                               |
| Day/Night                  | Yes                                                                                                                                                                                                                                               |
| Backlight Compensation     | Yes                                                                                                                                                                                                                                               |
| AI Face Detection Focus    | Yes                                                                                                                                                                                                                                               |
| AI Face Auto Exposure      | Yes                                                                                                                                                                                                                                               |
| Scene Style                | Default, Clear, Bright, Soft, Bolin                                                                                                                                                                                                               |
| Focus Zone                 | Face Priority, All Area, Upper/Central/Lower Area                                                                                                                                                                                                 |
| <b>Mechanical</b>          |                                                                                                                                                                                                                                                   |
| Pan Movement               | PAN: 340° (-170° to +170°); Fully proportional 0.05° to 100°/s                                                                                                                                                                                    |
| Tilt Movement              | TILT: 120° (-30° to +90°); Fully proportional 0.05° to 75°/s                                                                                                                                                                                      |
| Speed Proportional         | Pan/Tilt Speed proportional to zoom range                                                                                                                                                                                                         |
| Preset Position            | 255 positions, Speed 100°/s, 0~5 Level Adjustable, Accuracy: 0.1°                                                                                                                                                                                 |
| Preset Memory              | Picture Profile Preset-Preset Memory for image parameters: Backlight Compensation, White Balance, R-Gain/B-Gain, Auto Exposure, Bright, Iris, Shutter, Gain, Aperture, Effect, Noise Reduction, Mirror, Gamma, Ex-COMP, Color Hue, Contrast etc.) |
| Motionless Preset          | YES, ON/OFF                                                                                                                                                                                                                                       |
| PTZ Trace Memory           | YES, 12                                                                                                                                                                                                                                           |
| Cruise                     | YES, 4                                                                                                                                                                                                                                            |
| Quietness                  | NC35 Compliant                                                                                                                                                                                                                                    |
| Home Position              | Yes                                                                                                                                                                                                                                               |
| FreeD                      | Yes, FreeD protocol for AR/VR camera tracking, via serial control/IP (Via fw upgrade)                                                                                                                                                             |
| Environmental              | Indoor, IP50                                                                                                                                                                                                                                      |
| <b>Interface</b>           |                                                                                                                                                                                                                                                   |
| HDMI Video Output          | HDMI 2.0 Type A                                                                                                                                                                                                                                   |
| SDI Video Output           | 12G-SDI, SMPTE424M /SMPTE292M /SMPTE 296M / SMPTE 274M /SMPTE ST-2081 /SMPTE ST-2082 standards, 75Ω BNC x 2, SDI/PM for output to has OSD display                                                                                                 |
| SDI Optical Fiber Output   | Optical 12G-SDI (Module Excluded). Detachable slot, Connector: Duplex LC (optional via ST, LC or SMPTE)<br>Laser Unit: Single-mode 1,310nm DFB-LD transmitter and PIN receiver<br>Complaint with MSA SFP+ Specification SFF-8402.                 |
| Network LAN Port           | RJ45X1, Standard 10M/100M/1000M Base-TX Ethernet, LAN connector for IP control/video output/audio output/System FW Upgrade                                                                                                                        |
| Synchronization System     | Internal/External synchronization (BBS/Tri-level sync)                                                                                                                                                                                            |
| External Sync Input        | Genlock, BNC connector, BBS (Black Burst Sync), tri-level sync supported                                                                                                                                                                          |
| Audio Input                | Balanced XLR (Hirose Connector via Atomos 10-Pin LEMO Type to XLR Breakout Cable) with 48V Phantom power<br>3.5mm TRRS for bidirection audio intercom                                                                                             |
| Audio Output               | Balanced XLR (via Atomos 10-Pin LEMO Type to XLR Breakout Cable), embedded with HDMI, SDI, USB and IP<br>3.5mm TRRS for bidirection audio intercom                                                                                                |
| Tally Light                | Red, Green Color/Front and Rear                                                                                                                                                                                                                   |
| Dip Switch                 | Video Resolution Dip Switch x1                                                                                                                                                                                                                    |
| System Firmware Upgrade    | Upgrade via IP for camera system MCU, Driver, FPGA and Encoder                                                                                                                                                                                    |
| Power Connector Type       | INPUT: DC12V, connect with screw secure (Type - 5.5mm×2.1mm Male DC Power Plug Connector & Screw Lock Female Panel Socket<br>INPUT: RJ45, PoE++ (IEEE802.3bt)                                                                                     |
| Control Interface          | RJ45X1-RS422, RJ45X1-IP Control, IR Remote Control                                                                                                                                                                                                |
| Control Protocol           | Serial: VISCA, PELCO P/D; IP: VISCA Over IP, ONVIF; FreeD (via Hw Upgrade)                                                                                                                                                                        |

# SPECIFICATIONS

|                                                                                           |                                                                                                                                                                                         |
|-------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Model Number</b>                                                                       | <b>R9-420F</b>                                                                                                                                                                          |
| <b>Codec</b>                                                                              |  <b>FAST HEVC</b>                                                                                      |
| <b>HDMI Video Signal System</b>                                                           |                                                                                                                                                                                         |
| HDMI Video Format                                                                         | 3840 x 2160p/59.94/60/50/29.97/30/25/23.98/24<br>1920 x 1080p/59.94/60/50/29.97/30/25/23.98/24<br>1920 x 1080i/59.94/60/50<br>1280 x 720p/59.94/60/50                                   |
| Color Precision                                                                           | 12bit(HDMI), YUV4:2:2, YUV4:2:0                                                                                                                                                         |
| Color Space                                                                               | YUV, RGB                                                                                                                                                                                |
| OSD Menu Display                                                                          | Yes, with image insert                                                                                                                                                                  |
| On-Screen Title                                                                           | Yes, video embedded On-Screen title character generator                                                                                                                                 |
| <b>SDI Signal Format</b>                                                                  |                                                                                                                                                                                         |
| SDI Video Format                                                                          | 3840 x 2160p/59.94/60/50/29.97/30/25/23.98/24<br>1920 x 1080p/59.94/60/50/29.97/30/25/23.98/24<br>1920 x 1080i/59.94/60/50<br>1280 x 720p/59.94/60/50                                   |
| Color Precision                                                                           | 10bit(SDI), YUV 4:2:2                                                                                                                                                                   |
| Color Space                                                                               | YUV                                                                                                                                                                                     |
| Standard                                                                                  | SMPTE 292M, SMPTE 296M (1.5Gb/s), SMPTE 424M, SMPTE 274M, SMPTE 425-A (3Gb/s), SMPTE 2081(6Gb/s), SMPTE 2082-1 (12Gb/s) standard / 75 Ω (BNC x 1), With SMPTE352 SDI Metadata Supported |
| True Dual Output                                                                          | HDMI and SDI signal can be output with different format                                                                                                                                 |
| OSD Menu Display                                                                          | Yes                                                                                                                                                                                     |
| On-Screen Title                                                                           | Yes, video embedded On-Screen title character generator                                                                                                                                 |
| <b>Network</b>                                                                            |                                                                                                                                                                                         |
| Video Compression (Codec)                                                                 | AVC-H.264/HEVC-H.265/MJPEG/MP4 by FPGA                                                                                                                                                  |
| IP Resolution/Frame Rate                                                                  | 3840x2160p/60/50/30/25, 1920x1080p60/50/30/25, 1280x720p60/50                                                                                                                           |
| True Dual Output                                                                          | IP, HDMI, and SDI signal can be set with different format                                                                                                                               |
| IP Protocols                                                                              | TCP/IP, IGMP, ICMP, ARP, QoS, SNMP, UDP, HTTP, DNS, DHCP, FTP, NTP, UPNP, SRT                                                                                                           |
| Application Protocols                                                                     | RTMP, RTSP, RTP Streaming (Unicast, Multicast), MP2TS over UDP (Unicast, Multicast), TS over RTP, TS over SRT, WebRTC, RTSP Encryption                                                  |
| Color Format                                                                              | 10bit, YUV 4:2:2                                                                                                                                                                        |
| Multi-stream                                                                              | 2 stream                                                                                                                                                                                |
| Audio Compression                                                                         | 64Kbps(G.711) / 16Kbps(G.722.1) / 16Kbps(G.726) / 32-128Kbps(MP2L2) / 32-128Kbps(AAC-LC) Selectable                                                                                     |
| OSD                                                                                       | Customized OSD                                                                                                                                                                          |
| Compatible Integration                                                                    | ONVIF2.4 (Profile S/G/T), VISCA Over IP                                                                                                                                                 |
| Bandwidth ( results may vary depending on network configuration and management settings.) | 30-50Mbps, 4kp60 12 bit 4:2:2                                                                                                                                                           |
|                                                                                           | 10-20Mbps, 1080p60 12 bit 4:2:2                                                                                                                                                         |
| Latency (Overall latency may increase depending on network configurations)                | 2-3 frame (e.g. 2160p60 latency is < 45ms glass to glass)                                                                                                                               |
| Browser Support                                                                           | Cross Browser Compatibility - HTML5 support for Microsoft Edge, Google Chrome, Firefox, and Safari                                                                                      |
| <b>General</b>                                                                            |                                                                                                                                                                                         |
| Operating Temperature                                                                     | -10 °C to 50 °C (14°F to 122°F)                                                                                                                                                         |
| Operating Humidity                                                                        | ≤80% Suitable for Use (no condensation)                                                                                                                                                 |
| Power Input                                                                               | DC12V, PoE++(Compatible with IEEE802.3bt, Type 4 Class8)                                                                                                                                |
| Power Consumption                                                                         | Min: 29W (Static state with no movement)                                                                                                                                                |
|                                                                                           | Max: 50W (Fully loaded operation)                                                                                                                                                       |
| Installation Method                                                                       | Stand-alone (Upright) or suspended (Pendent) or Tripod                                                                                                                                  |
| Mount                                                                                     | Ceiling mount, Wall mount, Tripod                                                                                                                                                       |
| Handle                                                                                    | Built-in for portable use application                                                                                                                                                   |
| Size of Tripod Screw Hole                                                                 | 1 x 1/4" safety bond point                                                                                                                                                              |
| Body Color                                                                                | Black                                                                                                                                                                                   |
| Dimension-Camera                                                                          | 201*253*249mm(W*D*H), 201*253*256(with feet mats)                                                                                                                                       |
| Net Weight                                                                                | 3.8kg (8.36lb)                                                                                                                                                                          |
| Accessories Included                                                                      | IR Remote controller x1, Power adapter and power cord (US, EU, UK), Mounting screws x3, RJ45 to RS422 Extension cable                                                                   |

# ACCESSORIES

Items marked \* are optional to purchase



VCC-RC-2  
IR Remote Controller



VCC-P12-4  
12VDC 4A Power Adapter



EG40F  
\*FAST HEVC Decoder



C-PMSB  
\*Pendant Mount for Drop Ceiling  
/Hard Surface Ceiling



C-WM3B  
\*Wall Mount Bracket-Size 3



C-WM2B-CV  
\*Wall Mount Cover-Size 3



C-WPLB  
\*Wall Mount Plate



BL-CM-01  
\*Ceiling Mount Bracket



BL-PP97  
\*97W POE POWER INJECTOR



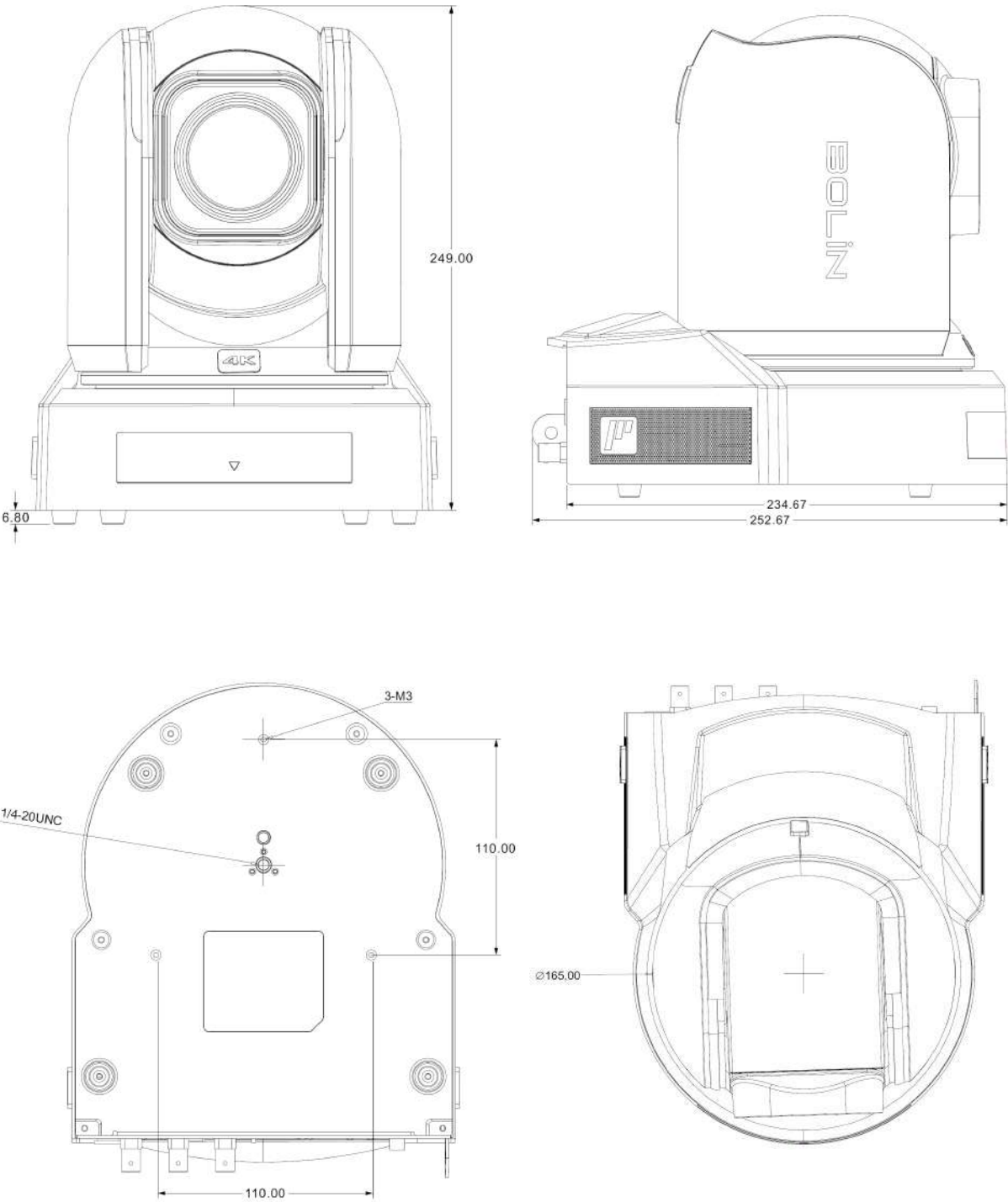
BLA-10  
\*LEMO connector  
10Pin Mini to XLR L/R In/Out

## ORDER INFORMATION

- R9-420F (4K60, 20X, FAST HEVC, Black)

DIMENSIONS

Unit: mm



All models and specifications are subject to change without notice.  
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