

# **CSA1-N8S1684X**

8-node 256TOPS cluster server



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T-CHIP INTELLIGENCE TECHNOLOGY

# **Product features**





### 256TOPS powerful computing power

The SOPHON AI processor is BM1684X and supports up to 256TOPS (INT8) peak computing power or 128TFLOPS (FP16/BF16) or 16TFLOPS (FP32) high-precision computing power, which can meet the application requirements of deep learning model development.



### Powerful multi-channel video full-process processing

It supports up to 256 channels of H.265/H.264 1080p@25fps video decoding, 256 channels of H.265/H.264 1080P@25fps HD video processing (decoding + AI analysis), and 96 channels of H.265/H.264 1080p@25fps video encoding, meeting the needs of various AI application scenarios such as face detection, license plate recognition, and smart cities in video streaming.



### Standard 1U rack server

Highly dense and tightly deployed. The server can be configured with up to 8 BM1684X computing modules, and users can customize the number of computing modules and storage configuration at will. The standard 1U rack server chassis design is designed to fit most types of racks in the data center.



# **Product features**





### **Rich algorithms and strong practicality**

It supports the transplantation of various algorithms such as human/vehicle/object recognition, video structuring, trajectory behavior analysis, etc., with high security and high reliability, and can be flexibly applied to various product research and development.



### Open SDK, one-stop AI development kit

SOPHON SDK (BMNNSDK2) is a one-stop deep learning development toolkit that provides a series of software tools such as underlying driver environment, compiler, inference deployment tool, etc. Support mainstream frameworks such as Caffe/TF/PyTorch/Mxnet/ Addle, support mainstream network models and custom operator development, support Docker containerization, and enable rapid deployment of algorithm applications.



### A wide range of applications

It is widely used in application scenarios such as edge computing, cloud storage, blockchain, multi-channel video encoding and decoding, intelligent security, and multi-application opening.



# Specifications

Basic Specifications     Storage     32GB eMMC × 8 (Number of Compute Nodes)     1 control node       Basic Specifications     Storage     32GB eMMC × 8 (Number of Compute Nodes), 3.5-inch SATA 3.0 hard drive × 1       Power consumption     Normal: 160W~180W, Max: 220W~280W     Normal: 160W~180W, Max: 220W~280W       BMC     Integrated BMC management system, providing a web-based management interface, BMC management system, providing a web-based management interface, BMC management system, 2300m × 44.4mm       Size     Standard 1U rack servers: 490mm × 390mm × 44.4mm       Environment     Operating Temperature: 0°C ~ 50°C, Operating Humidity: 10% ~ 90%RH(non-condensing)			Specifications
Al computing power     256TOPS (INT8) peak computing power, 128TFLOPS (FP16/BF16) computing power, 16TFLOPS (FP3 Encoding/ Decoding)       Encoding/ Decoding     H.265/H.264 1080p@6400fps video decoding, 1080P@6400fps HD video processing (decoding + Al Decoding)       Number of nodes     8 compute nodes (up to 64 ARM cores) + 1 control node       CPU     Compute node: BM1684X octa-core (A53x8) 64-bit processor, with a maximum frequency of 2.3 GF Control node: RK3588S octa-core (4× Cortex-A76+4×Cortex-A55) 64-bit processor, with a maximum frequency of 2.3 GF       Storage     32GB eMMC × 8 (Number of Compute Nodes)       Storage     32GB eMMC × 8 (Number of Compute Nodes), 3.5-inch SATA 3.0 hard drive × 1       Power     300W AC power supply (input: 100V AC-240V AC)       Power     Normal: 160W-180W, Max: 220W-280W       BMC     Integrated BMC management system, providing a web-based management interface, BMC manage framework       Size     Standard 1U rack servers: 490mm × 390mm × 44.4mm       Environment     Operating Temperature: 0°C ~ 50°C, Operating Humidity: 10% ~ 90%RH(non-condensing)       Internet     SFP 10GE × 2, Gigabit Ethernet (RJ45) × 2 (1 control node port, 1 common network port), 4G LTE/5G Display       USB     USB3.0 HOST × 2, Type-C × 1 (For processor core board display)		Product name	Computing power cluster server
Basic     Spower     23610PS (IN18) beak computing power, 1281FLOPS (PF16/BF16) computing power, 161FLOPS (PF3       Basic     Encoding/ Decoding     H.265/H.264 1080p@6400fps video decoding, 1080P@6400fps HD video processing (decoding + Al Number of nodes       Basic     CPU     Compute nodes (up to 64 ARM cores) + 1 control node       CPU     Compute node: BM1684X octa-core (AS3x8) 64-bit processor, with a maximum frequency of 2.3 GF Control node: RK35885 octa-core (4x Cortex-A76+4xCortex-A55) 64-bit processor, with a maximum RAM       166B LPDDR4 × 8 (Number of Compute Nodes)     3.5-inch SATA 3.0 hard drive × 1       Power     300W AC power supply (input: 100V AC-240V AC)       Power     300W AC power supply (input: 100V AC-240V AC)       OS     Linux       BMC     Integrated BMC management system, providing a web-based management interface, BMC manage framework       Size     Standard 1U rack servers: 490mm × 390mm × 44.4mm       Environment     Operating Temperature: 0°C ~ 50°C, Operating Humidity: 10% ~ 90%RH(non-condensing)       Internet     SFP 10GE × 2, Gigabit Ethernet (RJ45) × 2 (1 control node port, 1 common network port), 4G LTE/5G Display       HDM12.0 × 1 (4K@60Hz, main processor core board display)     USB USB3.0 HOST × 2, Type-C × 1 (For processor core board debugging)		Product model	CSA1-N8S1684X
Decoding     H.265/H.264 1080p@6400tps video decoding, 1080P@6400tps HD video processing (decoding + Al Number of nodes       Number of nodes     8 compute nodes (up to 64 ARM cores) + 1 control node       CPU     Control node: RM3684X octa-core (A53x8) 64-bit processor, with a maximum frequency of 2.3 GF Control node: RK35885 octa-core (4x Cortex-A76+4xCortex-A55) 64-bit processor, with a maximum frequency of 2.3 GF Control node: RK35885 octa-core (4x Cortex-A76+4xCortex-A55) 64-bit processor, with a maximum frequency of 2.3 GF Control node: RK35885 octa-core (4x Cortex-A76+4xCortex-A55) 64-bit processor, with a maximum frequency of 2.3 GF Control node: RK35885 octa-core (4x Cortex-A76+4xCortex-A55) 64-bit processor, with a maximum frequency of 2.3 GF Control node: RK35885 octa-core (4x Cortex-A76+4xCortex-A55) 64-bit processor, with a maximum frequency of 2.3 GF Control node: RK35885 octa-core (4x Cortex-A76+4xCortex-A55) 64-bit processor, with a maximum frequency of 2.3 GF Control node: RK35885 octa-core (4x Cortex-A76+4xCortex-A55) 64-bit processor, with a maximum frequency of 2.3 GF Control node: RK35885 octa-core (4x Cortex-A76+4xCortex-A55) 64-bit processor, with a maximum frequency of 2.3 GF Control node: RK35885 octa-core (4x Cortex-A76+4xCortex-A55) 64-bit processor, with a maximum frequency of 2.3 GF Control node: RK35885 octa-core (4x Cortex-A76+4xCortex-A55) 64-bit processor, with a maximum frequency of 2.3 GF Control node: RK35885 octa-core (4x Cortex-A76+4xCortex-A55) 64-bit processor, with a maximum frequency of 2.3 GF Control node: RK35885 octa-core (4x Cortex-A55) 64-bit processor, with a maximum frequency of 2.3 GF Control node: RK35885 octa-core (4x Cortex-A55) 64-bit processor, with a maximum frequency of 2.3 GF Control note: RK35885 octa-core dover 200W       Size     Standard 1U rack servers: 490mm x 390mm x 44.4mm </td <td></td> <td>256TOPS (INT8) peak computing power, 128TFLOPS (FP16/BF16) computing power, 16TFLOPS (FP32</td>			256TOPS (INT8) peak computing power, 128TFLOPS (FP16/BF16) computing power, 16TFLOPS (FP32
Basic     Stompute nodes (up to 64 ARM cores) + 1 control node       CPU     Compute node: BM1684X octa-core (A53×8) 64-bit processor, with a maximum frequency of 2.3 GF Control node: RX3588S octa-core (4× Cortex-A76+4×Cortex-A55) 64-bit processor, with a maximum frequency of 2.3 GF Control node: RX3588S octa-core (4× Cortex-A76+4×Cortex-A55) 64-bit processor, with a maximum frequency of 2.3 GF Control node: RX3588S octa-core (4× Cortex-A76+4×Cortex-A55) 64-bit processor, with a maximum frequency of 2.3 GF Control node: RX3588S octa-core (4× Cortex-A76+4×Cortex-A55) 64-bit processor, with a maximum frequency of 2.3 GF Control node: RX3588S octa-core (4× Cortex-A76+4×Cortex-A55) 64-bit processor, with a maximum frequency of 2.3 GF Control node: RX3588S octa-core (4× Cortex-A76+4×Cortex-A55) 64-bit processor, with a maximum frequency of 2.3 GF Control node: RX3588S octa-core (4× Cortex-A76+4×Cortex-A55) 64-bit processor, with a maximum frequency of 2.3 GF Control node: RX358S octa-core (4× Cortex-A76+4×Cortex-A55) 64-bit processor, with a maximum frequency of 2.3 GF Control node: RX358S octa-core (4× Cortex-A76+4×Cortex-A55) 64-bit processor, with a maximum frequency of 2.3 GF Control node: RX358S octa-core (4× Cortex-A76+4×Cortex-A55) 64-bit processor, with a maximum frequency of 2.3 GF Control node: RX358S octa-core desced prove and the prove			H.265/H.264 1080p@6400fps video decoding, 1080P@6400fps HD video processing (decoding + AI
Basic SpecificationsRAM16GB LPDDR4 × 8 (Number of Compute Nodes)Basic SpecificationsRAM16GB LPDDR4 × 8 (Number of Compute Nodes)Basic SpecificationsStorage32GB eMMC × 8 (Number of Compute Nodes), 3.5-inch SATA 3.0 hard drive × 1Power consumption300W AC power supply (input: 100V AC~240V AC)Power consumptionNormal: 160W~180W, Max: 220W~280WOSLinuxBMCIntegrated BMC management system, providing a web-based management interface, BMC management system, providing a web-based management interface, BMC management frameworkSizeStandard 1U rack servers: 490mm × 390mm × 44.4mmEnvironmentOperating Temperature: 0°C ~ 50°C, Operating Humidity: 10% ~ 90%RH(non-condensing)Interface specificationsDisplayHDMI2.0 × 1 (4K@60Hz, main processor core board display)USBUSB3.0 HOST × 2, Type-C × 1 (For processor core board debugging)			8 compute nodes (up to 64 ARM cores) + 1 control node
Basic Specifications     Storage     32GB eMMC × 8 (Number of Compute Nodes), 3.5-inch SATA 3.0 hard drive × 1       Power     300W AC power supply (input: 100V AC~240V AC)     Power       Power     Normal: 160W~180W, Max: 220W~280W     Down       0S     Linux     Linux       BMC     Integrated BMC management system, providing a web-based management interface, BMC management framework       Size     Standard 1U rack servers: 490mm × 390mm × 44.4mm       Environment     Operating Temperature: 0°C ~ 50°C, Operating Humidity: 10% ~ 90%RH(non-condensing)       Internet     SFP 10GE × 2, Gigabit Ethernet (RJ45) × 2 (1 control node port, 1 common network port), 4G LTE/5G       Display     HDMI2.0 × 1 (4K@60Hz, main processor core board display)       USB     USB3.0 HOST × 2, Type-C × 1 (For processor core board debugging)		CPU	Compute node: BM1684X octa-core (A53×8) 64-bit processor, with a maximum frequency of 2.3 GH Control node: RK3588S octa-core (4× Cortex-A76+4×Cortex-A55) 64-bit processor, with a maximum
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BMC   Integrated BMC management system, providing a web-based management interface, BMC management framework     Deep learning framework   TensorFlow / PyTorch / Paddle / Caffe / ONNX / MXNet / DarkNet     Size   Standard 1U rack servers: 490mm × 390mm × 44.4mm     Environment   Operating Temperature: 0°C ~ 50°C, Operating Humidity: 10% ~ 90%RH(non-condensing)     Internet   SFP 10GE × 2, Gigabit Ethernet (RJ45) × 2 (1 control node port, 1 common network port), 4G LTE/5G     Display   HDMI2.0 × 1 (4K@60Hz, main processor core board display)     USB   USB3.0 HOST × 2, Type-C × 1 (For processor core board debugging)			Normal: 160W~180W, Max: 220W~280W
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		Display	HDMI2.0 × 1 (4K@60Hz, main processor core board display)
Fan module6 high-speed cooling fans		USB	USB3.0 HOST × 2, Type-C × 1 (For processor core board debugging)
		Fan module	6 high-speed cooling fans



32) high-precision computing power
I analysis), H.265/H.264 1080p@2400fps video encoding
Hz n frequency of 2.4GHz
gement system can be redeveloped
network (optional)

# Interface description

### Front view



### **Rear view**





# Dimension







### 44.4mm



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