16-channel 4K ePoE Network Video Recorder

1U Smart H.265+ Network Video Recorder with Analytics+

- Maximum 200 Mbps Incoming Bandwidth
- 16 IP Channel Video Access
- Smart H.265+ and Smart H.264+ Video Compression
- Perimeter Protection with 10 Rule Definitions per Channel (up to 4 channels)
- Video Stream Face Recognition (up to 2 channels)
- Processes 12 Facial Images per Second
- Facial Database Management, Stores up to 20,000 Faces
- Stranger Mode to Detect Faces not Stored in Database
- 16 PoE Ports, Ports 1 to 8 Support ePoE and EoC Signal Transmission up to 800 m (2625 ft)
- Five-year Warranty*

| Perimeter Protection | Face Capture | Face Recognition | Image Search | Heat Map | Blacklist Alarm | People Counting | False Alarm Filter |

System Overview

The Dahua DHI-NVR4216-16P-I combines Analytics+ algorithms with an Dahua's ePoE technology into an all-in-one network video recorder. This NVR uses a powerful multi-core processor to provide 4K resolution processing for applications where impeccable image details are required. In addition, the NVR can be employed as edge storage, central storage, or backup storage with an intuitive shortcut operation menu for remote management and control.

The Dahua Analytics+ algorithms significantly improve accuracy and reliability, as compared to standard intelligent features, to achieve precision human facial analysis, and support two (2) channels of real-time face recognition based on a database that stores up to 20,000 faces. The NVR also offers advanced perimeter protection that distinguishes between human and vehicular violations on up to four (4) channels simultaneously. The DHI-NVR4216-16P-I is ideal for applications that require entrance/exit management, where knowing who is coming and going is a valuable asset.

Functions

Perimeter Protection

Dahua Analytics+ includes Tripwire and Intrusion functions that offer custom tripwires based on object type for automation in limited access areas. Perimeter Protection requires less pixels to detect an object to deliver improved accuracy and decreased false alarms due to lights, weather, trees, or animals.

Real-time Face Recognition

Analytics+ performs real-time facial recognition on up to two (2) streaming video channels simultaneously. The server captures and analyzes facial features to determine gender, age, expression, glasses, moustache, and mask, and then can record the faces and store the associated structured data. The server also filters incoming video to display faces that match target features.

Stranger Mode

The NVR supports two facial detection modes: Common and Stranger. In Stranger mode, when the NVR detects a face not stored in the device's database, it can trigger an alarm, a buzzer, take a snapshot, or initiate recording. It also incorporates a Similarity Threshold, where the server triggers an alarm for a face that does not match a minimum recognition level. The Stranger Mode and the Similarity Threshold are designed for critical infrastructure sites where access control is of vital importance.

Efficient Search

The NVR searches images by facial features to improve search efficiency. The server support uploading and storing 20,000 facial images for comparison with recorded faces. This search capability allows operators to quickly and easily search multiple channel recordings to determine when and where a person of interest appeared in a recording.

Face Database Management

In addition to the 20,000 facial images, the NVR database also stores names, genders, birthdays, nationality, address, and ID information associated with each facial image. The NVR also offers powerful and configurable database management features that can be applied to each face recognition channel independently.

Smart H.265+

Smart H.265+ is the optimized implementation of the H.265 codec that uses a scene-adaptive encoding strategy, dynamic GOP, dynamic ROI, flexible multi-frame reference structure and intelligent noise reduction to deliver high-quality video without straining the network. Smart H.265+ technology reduces bit rate and storage requirements by up to 90% when compared to the H.264 video compression standard.

ONVIF

Technical Specification

System

Main Processor	Multi-core Embedded Processor
Operating System	Embedded LINUX

Analytics+ Perimeter Protection[1,2]

Performance	• Four (4) channels • 10 Tripwire/Intrusion rules per channel
Object Classification	• Human or Vehicle • Secondary Recognition for Tripwire and Intrusion
Search	• Search by object classification (human or vehicle)

Analytics+ Face Recognition[1,2]

Performance	• Process 12 facial images per second • Up to two (2) channels of video stream face recognition
Stranger Mode	• Detects a face not stored in the IVSS database. • Similarity Threshold set manually.
Search by Image	• Up to eight (8) target face image searches simultaneously. • Supports Similarity Threshold for each target face image.
Database Management	• 10 Face Databases • 20,000 total face images. • Stores name, gender, birthday, nationality, address, ID information for each face picture.
Database Application	Each database can be applied to video channels independently.
Trigger Events	Buzzer, Voice Prompts, Email, Snapshot, Recording, Alarm Out, PTZ Activation

Audio and Video

IP Camera Input	16 Channels
Audio	Input: One (1) Channel, RCA Output: (1) Channel, RCA

Display

Interface		One (1) HDMI Output One (1) VGA Output
Native Output Resolution	HDMI	3840 x 2160, 1920 x 1080, 1280 x 1024, 1280 x 720 1024 x 768
	VGA	3840 x 2160, 1920 x 1080, 1280 x 1024, 1280 x 720 1024 x 768
Maximum Decoding		Two (2) Channels of 8 MP at 30 fps Eight (8) Channels of 1080p at 30 fps
Multi-screen Display		1, 4, 8, 9, 16

Recording

Compression	Smart H.265+, H.265, Smart H.264+, H.264, MJPEG
Supported IP Camera Resolution	12 MP, 8 MP, 6 MP, 5 MP, 4 MP, 3 MP, 1080p, 1.3 MP, 720p, D1
Maximum Incoming Bandwidth	200 Mbps (80 Mbps when Analytics+ functions enabled)
Maximum Recording Bandwidth	200 Mbps (80 Mbps when Analytics+ functions enabled)
Bit Rate	16 Kbps to 20 Mbps per channel
Record Mode	Manual, Schedule (Continuous, Motion Detection, Alarm, IVS)
Record Interval	1 to 120 minutes (default: 60 minutes) Pre-record: 1 to 30 s Post-record: 10 to 300 s

Video Detection and Alarm

Trigger Events	Buzzer, Voice Prompt, Email, Snapshot, Recording, Alarm Out, PTZ Activation, Tour, Alarm Upload
Video Detection	Motion Detection, MD Zones: 396 (22 × 18); Video Loss, Tampering, and Scene Change
Alarm Inputs	Four (4) Channels
Relay Outputs	Two (2) Channels

Playback and Backup

Sync Playback	1, 4, 9, 16
Search Mode	Time and Date, Alarm, Motion Detection, and Exact Search (accurate to one second)
Playback Function	Play, Pause, Stop, Rewind, Fast Play, Slow Play, Next File, Previous File, Next Camera, Previous Camera, Full Screen, Repeat, Shuffle, Backup Selection, Digital Zoom
Backup Mode	USB Device, Network

Third-party Support

Third-party Support	Arecont Vision, Airlive, AXIS, Canon, Dynacolor, JVC, LG, Panasonic, Pelco, Xunmei, Samsung, Sanyo, Sony, Watchnet, plus more

Network

Interface	One (1) RJ-45 Port (10/100/1000 Mbps)
PoE	16 PoE Ports (IEEE802.3af/at)
ePoE and EoC	Ports 1 through 8
Network Function	HTTP, HTTPS, TCP/IP, IPv4/IPv6, UPnP, SNMP, RTSP, UDP, SMTP, NTP, DHCP, DNS, IP Filter, PPPoE,DDNS, FTP, Alarm Center, IP Search (Support Dahua IP camera, DVR, NVS, etc.), P2P
Maximum User Access	128 Users
Mobile Operating Systems	IOS, Android
Interoperability	ONVIF Profile S, SDK, CGI

Storage

Internal HDD	Two (2) SATA III Ports, up to 8 TB capacity for each HDD

Auxiliary Interface

USB	One (1) USB 2.0 Port, rear One (1) USB 2.0 Port, front
RS232	One (1) Port for PC Communication and Keyboard

1. The NVR is capable of processing one (1) Analytics+ function per channel, either Face Recognition or Perimeter Protection.
2. The capabilities of the listed Analytics+ functions pertain to channels assigned to cameras without built-in Analytics+ functions. If all channels are assigned to cameras with Analytics functionality, the NVR is capable of the following Analytics+ functions: Face Recognition on eight (8) channels or Perimeter Protection on eight (8) channels.

Electrical

Power Supply	Single, 100 VAC to 240 VAC, 50/60 Hz, 3.5 A
Power Consumption	NVR: < 6.1 W, without HDD
PoE Budget	• 130 W Total Rated Power • Maximum 25.5 W for a single port

Environmental

Operating Conditions	−10° C to +55° C (14° F to 131° F), 86 kpa to 106 kpa
Storage Conditions	−20° C to +70° C (−4° F to 158° F), 0% to 90% RH

Construction

Dimensions	
NVR	1U, 375.0 mm x 321.0 mm x 53.80 mm (14.76 in. x 12.64 in. x 2.14 in.)
NVR with PFH101 Rack Mount Tray	482.60 mm x 326.48 mm x 53.80 mm (19.0 in. x 12.85 in. x 2.14 in.)
Net Weight	2.68 kg (5.91 lb), without HDD
Gross Weight	4.02 kg (8.86 lb), without HDD
Installation	Standard 19-in. Rack-mount

Certifications

Safety	UL 60950-1, EN60950-1, CAN/CSA C22.2 No. 60950-1-07
Electromagnetic Compatibility (EMC)	FCC CFR 47 Part 15 Subpart B ANSI C63.4-2014 EN55035, EN55032, EN55024, EN50130-4

Intelligence³

IVS triggers an alarm and takes a defined action for the following events:

Standard Features	• Tampering with the camera. • Camera loses or changes focus drastically. • Error writing to an onboard Micro SD card. • Error sending or receiving data over the network. • Unauthorized access to the camera.

Premium Features	
Motion	An object moves through any part of the scene.
Tripwire	A target crosses a user-defined line.
Intrusion	A target enters or exits a defined perimeter.
Scene Change	A person or object moves the camera to change the scene or covers the camera to obscure the scene.
Abandoned/Missing Object	A target leaves an object in designated area, or a target removes an object from the same designated area.

Advanced Features (records data from IP cameras with Advanced Features)

Facial Detection	Detects and captures a snapshot of a human face in a defined area within a scene.
Face Recognition	Triggers an event if the connected facial recognition camera matches a face to one stored on the camera's database.
People Counting	Measure the number of customers, visitors or passengers in a surveillance scene.
Heat Map	Generates a visual representation of data.

ePoE/EOC Transmission Distances

Via CAT5E/CAT6 Ethernet Cable
ePoE supply voltage 48 V
Maximum DC resistance < 10 Ω/100 m

Cable Length, m (ft)	Bandwidth, Mbps	PoE Load Capacity, W	Hi-PoE Load Capacity, W	Working Mode
100 (328)	100	25.5	53	IEEE/E100
200 (656)	100	25.5	33	E100
300 (984)	100	19	19	E100
400 (1312)	10	17	17	E10
500 (1640)	10	13	13	E10
800 (2625)	10	7	7	E10

Via CAT5E/CAT6 Ethernet Cable
ePoE supply voltage 53 V
Maximum DC resistance < 10 Ω/100 m

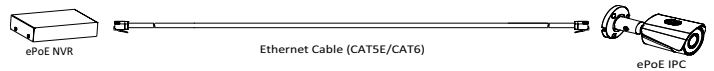| Cable Length, m (ft)	Bandwidth, Mbps	PoE Load Capacity, W	Hi-PoE Load Capacity, W	Working Mode
100 (328)	100	25.5	53	IEEE/E100
200 (656)	100	25.5	47	E100
300 (984)	100	25.5	32	E100
400 (1312)	10	23	26	E10
500 (1640)	10	20	20	E10
800 (2625)	10	13	13	E10

Via RG-59 Coaxial Cable
ePoE supply voltage 48 V
Maximum DC resistance < 5 Ω/100 m

Cable Length, m (ft)	Bandwidth, Mbps	PoE Load Capacity, W	Hi-PoE Load Capacity, W	Working Mode
100 (328)	100	25.5	50	IEEE/E100
200 (656)	100	25.5	30	E100
300 (984)	100	18	18	E100
400 (1312)	100	15	15	E100
500 (1640)	10	12	12	E10
800 (2625)	10	6	6	E10
1000 (3281)	10	5	5	E10

Via RG-59 Coaxial Cable
ePoE supply voltage 53 V
Maximum DC resistance < 5 Ω/100 m

Cable Length, m (ft)	Bandwidth, Mbps	PoE Load Capacity, W	Hi-PoE Load Capacity, W	Working Mode
100 (328)	100	25.5	52	IEEE/E100
200 (656)	100	25.5	48	E100
300 (984)	100	25.5	30	E100
400 (1312)	100	20	23	E100
500 (1640)	10	16	16	E10
800 (2625)	10	10	10	E10
1000 (3281)	10	8	8	E10

ePoE and EoC Applications

Pure Ethernet

ePoE NVR — Ethernet Cable (CAT5E/CAT6) — ePoE IPC

Passive EoC

ePoE NVR — LR1002 — Coaxial Cable — LR1002 — ePoE IPC

EoC with Single-port EoC Receiver

ePoE NVR — LR1002 — Coaxial Cable — LR1002-1ET — Network Cable — PoE IPC
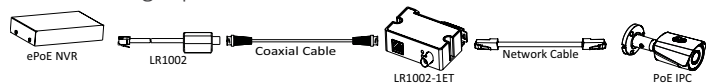
3. Each channel supports using either an IVS function or an Analytics+ function at one time.

Ordering Information

Type	Part Number	Description
NVR	DHI-NVR4216-16P-I	16-channel 1U ePoE 4K, H.265 Network Video Recorder with Analytics+
	DHI-NVR4216-16P-I-1T	16-channel 1U ePoE 4K, H.265 Network Video Recorder with Analytics+, 1 TB
	DHI-NVR4216-16P-I-2T	16-channel 1U ePoE 4K, H.265 Network Video Recorder with Analytics+, 2 TB
	DHI-NVR4216-16P-I-4T	16-channel 1U ePoE 4K, H.265 Network Video Recorder with Analytics+, 4 TB
Accessories, optional	PFH101	Rack Mount Tray 482.60 mm x 281.20 mm x 43.7 mm (19.0 in. x 11.07 in. x 1.72 in.)
ePoE Accessories	LR1002	EoC Passive Converter
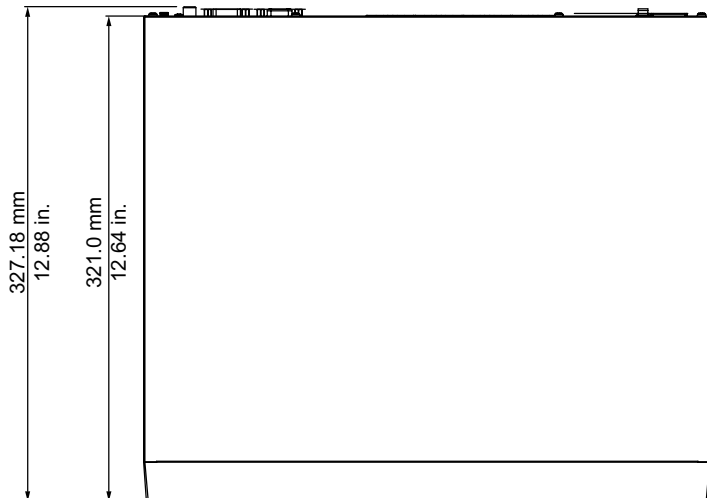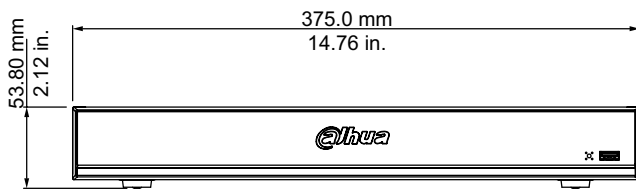
Rear Panel
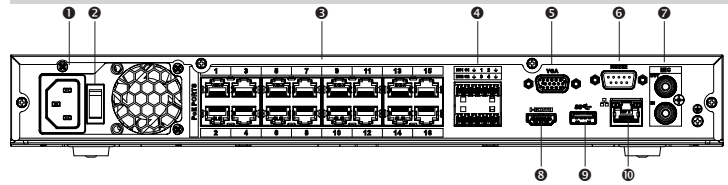
1	Power Input	6	RS232 Port
2	Power Switch	7	Audio Input (x1 RCA) Audio Output (x1 RCA)
3	PoE/PoE+ Ports (x16 RJ-45) ePoE/EoC Ports: 1 through 8	8	HDMI Output
4	Alarm Input (x2) Alarm Output (x2)	9	USB 3.0 Port
5	VGA Output	10	RJ-45 Ethernet Port (1000 Mbps)

Dimensions(mm/in.)

375.0 mm
14.76 in.

53.80 mm
2.12 in.

327.18 mm
12.88 in.

321.0 mm
12.64 in.