dahua
TECHNOLOGY

Hybrid Thermal Network Bullet Camera
256 x 192 Thermal Sensor and a 2 MP CMOS Sensor

System Overview

The Hybrid Thermal Network camera combines an uncooled VOx 256 x 192 thermal imager with a 2 MP visible-light sensor for cost-effective, long-range surveillance in a rugged all-in-one package. The thermal imager coupled with an athermalized, focus-free lens produces crisp images in total darkness and sees through rain, fog, and snow. The visible imager with an IR illuminator delivers superior video in any lighting condition.

Functions

Uncooled Vanadium Oxide (VOx) Technology
Dahua thermal cameras use an uncooled Vanadium Oxide (VOx) sensor that delivers higher thermal sensitivity in a more compact and cost-effective package. Vanadium Oxide cameras are also more reliable, as compared to other thermal imaging technologies, due to less moving parts.

Athermalized Lens
The athermalized lens used in Dahua thermal cameras maintains the focus position passively and without power over a wide temperature range.

Excessive Temperature Detection and Alarm
With built-in temperature functionality, the camera can detect a rapid rise in temperature over a short time and issue an alarm even at long distances. Because thermal cameras are sensitive to temperature, they provide higher detection accuracy than standard cameras, making them particularly fit for applications such as forests, warehouse complexes, and industrial areas.

Active Alarm
The camera is equipped with a white-light illuminator and an external speaker that can be triggered when the camera detects an abnormal event either via the thermal or the visible-light sensor. The camera also takes a snapshot of the scene and can record the snapshot.

Thermal Camera
- 256 x 192 VOx Uncooled Thermal Sensor Technology
- Athermalized Lens, Focus-free
- 7 mm Fixed Thermal Lens
- ≤ 50 mK Thermal Sensitivity

Visible-light Camera
- 1/2.8-in. 2 MP Progressive-scan CMOS Sensor
- 8 mm Fixed Lens
- Maximum IR Distance 50 m (164.04 ft)

System Features
- Intelligent Video System with Excessive Temperature Detection
- Active Alarm with Voice Prompt and White Light
- Enhanced Power and Data Transmission Distances (ePoE)
- IP67 Ingress Protection
- Five-year Warranty*

High Thermal Sensitivity
The VOx detector offers high thermal sensitivity (≤ 50 mK) that allows Dahua thermal cameras to distinguish objects in a scene with minimal temperature differences. The camera captures detailed images where thermal contrast between object and background is minimal.

Enhanced Power over Ethernet (ePoE) Technology
Dahua's innovative ePoE technology offers a plug-and-play solution to transmit power and data over long distances via Ethernet or coaxial cables, reducing installation time and saving money. ePoE technology is a viable, cost-effective solution for extending transmission distances and for converting existing, coax-based analog systems into IP systems. For video security and surveillance installers, ePoE technology saves time and money by reducing overall cabling requirements, allowing for existing coax cable to be used, and minimizing the number of peripheral devices needed. For new installations, ePoE offers the ability to design long-distance applications without the need for additional repeaters.

Cybersecurity
Dahua network cameras are equipped with a series of key cybersecurity technologies including: security authentication and authorization, access control, trusted protection, encrypted transmission, and encrypted storage. These technologies improve the camera's ability to prevent malicious access and to protect data.

Environmental
With a temperature range of −30 °C to +60 °C (−22 °F to +140 °F), the camera is designed for extreme temperature environments. The camera complies with the IP67 rating makes it suitable for demanding outdoor applications.

Protection
The camera allows for ±15% input voltage tolerance, suitable for the most unstable conditions for outdoor applications. Its 6 KV lightning rating provides effective protection for both the camera and its structure against lightning

*Warranty applies to products sold through an authorized Dahua Dealer.

Technical Specification

Thermal Camera

Image Sensor	Uncooled VOx Focal Plane Detector
Effective Pixels	256 (H) x 192 (V)
Pixel Size	12 μm
Thermal Sensitivity (NETD)	< 50 mK
Spectral Range	8 μm to 14 μm
Image Setting	Brightness, Sharpness, ROI, AGC, FFC, 3D DNR
Color Palettes	18, including: Whitehot, Blackhot, Icefire, Fusion, Rainbow, Globow, Ironbow1, and Sepia

Thermal Lens

Lens Type	Fixed, DDE
Aperture	F1.0
Focus Control	Athermalized, Focus-free
Focal Length	7 mm
Angle of View	H: 24.0° V: 18.0°

DORI Distance[1]

Effective Distance, human (1.80 m x 0.50 m)[1]	Detection	292 m (958 ft)
	Recognition	75 m (246 ft)
	Identification	38 m (125 ft)
Effective Distance, vehicle (4.0 m x 1.40 m)[1]	Detection	778 m (2552 ft)
	Recognition	194 m (636 ft)
	Identification	97 m (318 ft)

Visible-light Camera

Image Sensor	1/2.8-in. CMOS
Effective Pixels	1920 (H) x 1080 (V), 2 MP
Electronic Shutter Speed	1/1 s to 1/30,000 s
Minimum Illumination	Color: 0.005 lux at F1.9 B/W: 0.0005 lux at F1.9 0 lux with IR On
IR Distance	50.0 m (164.04 ft)
IR On/Off Control	Auto, Manual
IR LEDs	One (1)

Video

Compression		H.265, H.264, H.264H, H.264B, MJPEG
Frame Rate	Main Stream	
	Thermal	1280 x 960, 1024 x 768, 640 x 480, 256 x 192 at 30 fps
	Visible	1920 x 1080, 1280 x 720, 704 x 480 at 30 fps
	Sub Stream	
	Thermal	640 x 480, 256 x 192 at 30 fps
	Visible	704 x 480, 352 x 240 at 30 fps
Bit Rate Control		CBR, VBR
Bit Rate		H.264: 640 Kbps to 8192 Kbps
Day/Night		Auto (ICR), Color, B/W
BLC Mode		BLC, HLC, Digital WDR
White Balance		Auto, Manual, Indoor, Outdoor, ATW, Street Lamp, Natural
Noise Reduction		2D, 3D
Motion Detection		Off, On (4 zones, Rectangular)
Region of Interest		Off, On (4 zones)
Defog		On, Off
Flip		0°, 90°, 180°, 270°
Mirror		Off, On
Privacy Masking		Off, On (4 areas, Rectangle)

Network

Ethernet	RJ-45 (10/100 Base-T)
Protocol	HTTP, TCP, ARP, RTSP, RTP, UDP, RTCP, SMTP, FTP, DHCP, DNS, DDNS, PPPOE, IPv4/v6, SNMP, QoS, UPnP, NTP
Interoperability	CGI
Streaming Method	Unicast, Multicast
Edge Storage	Network Attached Storage (NAS) Local PC for Instant Recording MicroSD Card Slot (up to 32 GB)
Maximum User Access	20 Users
User Management	Supports 20 users atone time and users are classified as one of tow groups: administrator or user
Security	Authorized username and password; attached MAC address; encrypted HTTPS; IEEE 802.1x; controlled network access
Web Viewer	IE 8 or later
Management Software	DSS Pro, DSS Express, DMSS
Mobile Operating System	IOS, Android
Cybersecurity	Video Encryption, Firmware Encryption, Configuration Encryption, Digest, WSSE, Account Lockout, Security Logs, IP/MAC Filtering, Generating and Importing X.509 Certification, Syslog, HTTPS, 802.1x, Trusted Boot, Trusted Execution, Trusted Upgrade

Certifications

Safety	UL 60950-1 CAN/CSA C22.2 No. 60950-1-07 EN 60950-1:2006 + A11:2009 + A1:2010 + A12:2011 + A2:2013 IEC 60950-1:2005 (Second Edition); Am1:2009 + Am2:2013
Electromagnetic Compatibility (EMC)	CFR 47 FCC Part 15 Subpart B EN 55032:2015, EN 61000 3 2:2014

Interface

Video	One (1) Port, BNC
Audio	Input: One (1) Channel, 3.5 mm Jack Output: One (1) Channel, 3.5 mm Jack
Audio Compression	G.711a, G.711Mu, PCM
RS485	One (1) Port
Alarm	Input: Two (2) Channel Output: Two (2) Channel
Alarm Linkage	SD Card Recording, On,off Output, Siren and Light, Email, PTZ, snapshot
Malfunction Detection	Motion Detection, Privacy Mask, Audio Detection, SD Card Abnormality, Network Abnormality, anti-burn warning

Electrical

Power Supply	12 VDC ±15%, 1.2 A, PoE (IEEE802.3af Class 0), or ePoE
Power Consumption	Maximum: 12 W

Environmental

Operating Temperature	−30° C to +50° C (−22° F to +122° F) Less than 95% RH
Storage Conditions	−30° C to +70° C (−22° F to +158° F)
Ingress Protection	IP67
Static Discharge Protection	6 KV

Construction

Casing	Metal
Dimensions	279.90 mm x 103.80 mm x 95.80 mm (11.02 in. x 4.09 in. x 3.77 in.)
Net Weight	1.40 kg (3.09 lb)
Gross Weight	1.90 kg (4.19 lb)

Intelligence

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	
Missing Object	Target leaves an object in designated area
Abandoned Object	Target removes an object from a designated area.
Tripwire	A target crosses a user-defined line.
Intrusion	A target enters or exits a defined perimeter.

Thermal Analytics+

Excessive Temperature Detection	Detects a rise in temperature over a short time and issues an alarm.
Cold/Hot Spot Trace	Indicates the coldest and the hottest spot of the scene.
Smoking Detection	Detects a person smoking in the thermal image and triggers a pre-determined action (voice prompt, white light) to alert the person of the smoking policy.
Human/Vehicle Classification	Detects human or vehicle violations using Tripwire or Intrusion detection methods.

Effective IVS Distances – Thermal Lens[2]

Human (1.80 m x 0.50 m)	52.50 m (172.24 ft)
Vehicle (4.0 m x 1.40 m)	146.50 m (480.64 ft)

ePoE 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

1. The DORI distance is a measure of the general proximity for a specific classification to help pinpoint the right camera for your needs. The DORI distance is calculated based on sensor specifications and lab test results according to EN 62676-4 , the standard that defines the criteria for the Detect, Observe, Recognize and Identify classifications. The Detection, Recognition, and Identification values shown are nominal values and should be used as estimates only. Exact value calculations depend on a wide variety of conditions.

Ordering Information

Type	Part Number	Description
Hybrid Network Camera	DH-TPC-BF3221	Hybrid Network Bullet Camera, Thermal: 256 x 192, 7 mm lens, Visible-light: 2 MP, 8 mm lens
Accessories, optional	PFA121	Junction Box
	PFA151	Corner Mount
	PFA152-E	Pole Mount
	DH-PFM320D-US	12 VDC, 2 A Power Adapter
	DH-PFM321D-US	12 VDC, 1 A Power Adapter

Accessories

Optional :
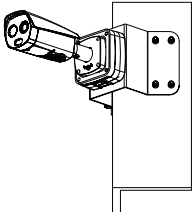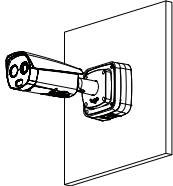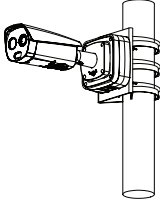
PFA121
Junction Box

PFA151
Corner Mount

PFA152-E
Pole Mount

DH-PFM320D-US
12 VDC, 2 A
Power Adapter

DH-PFM321D-US
12 VDC, 1 A
Power Adapter

Corner Mount
PFA121 + PFA151

Junction Mount
PFA121

Pole Mount
PFA121 + PFA150

Pole Mount
PFA121 + PFA152-E

Dimensions (mm/in.)

279.9 [11.02"]

181.5 [7.14"]

103.8 [4.09"]

95.8 [3.77"]

70.0 [2.76"]

4 4.5 [0.18"]

70.0 [2.76"]