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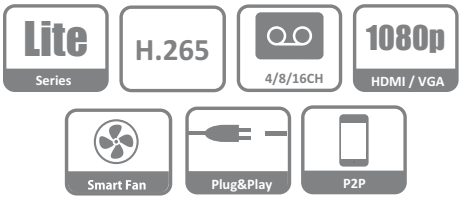
# 1080p H.265 Penta-brid HDCVI DVR

## 4+2/8+4/16+8-Channel Mini 1U HDCVI Digital Video Recorder

- Embedded Processor
- Smart H.265+ and Smart H.264+ Dual Codec
- Dual-stream Recording
- 1080p at 15 fps Maximum Recording Resolution
- 4, 8, or 16 HDCVI, AHD, TVI, CVBS Channels
- 4 + 2, 8 + 4, or 16 + 8 IP Channels, up to 6 MP per Channel
- Maximum 24/48/96 Mbps Incoming Bandwidth
- Built-in Smart Search
- Intelligent Video System
- One (1) SATA HDD Port, up to 10 TB per Hard Disk Drive
- Five-year Warranty*




## System Overview

The X51A Series HDCVI DVR offers 1080p recording on each HDCVI channel and a host of advanced features and functions. The X51A takes advantage of HDCVI technology for easy integration into existing video surveillance systems while leveraging existing networks, cabling, and cameras. Penta-brid access technology seamlessly records video from HDCVI, AHD, TVI, CVBS, and IP sources simultaneously.

The X51A utilizes the Smart H.265+ Codec to significantly improve encoding efficiency and to reduce bandwidth and storage costs. This recorder is the ideal solution for actively monitoring and recording video feeds in a wide range of applications including public venues, retail stores, transportation hubs and access ways, personal property and homes, and educational institutions.

### Camera Connections

Record and monitor video from analog/HDCVI camera inputs and IP camera inputs simultaneously. The X51A series supports a maximum of 24 channels, with up to 16 channels of HDCVI/AHD/TVI/CVBS inputs and up to an additional 8 channels of IP inputs. The flexibility of the HDCVI DVR allows all 24 channels to record input from IP cameras, or from a combination of input from analog and IP sources (not to exceed the maximum number of analog cameras allowed per recorder).

### Flexible Recording

The HDCVI DVR offers a variety of configurable recording options and schedule that saves HDD space and active monitoring time. The recorder monitors incoming video and can be programmed to record if motion is detected or if an alarm is triggered. The recorder can also be programmed to record on a schedule or at different intervals. The recording options and schedules can be set for each individual camera or copied to all cameras.

## Functions

### 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.

### HDCVI/AHD/TVI/CVBS Auto-detect

The HDCVI DVR automatically recognizes the incoming signals of each attached camera without any setup, making installation easy and operation convenient.

### Intelligent Video System (IVS)

With built-in IVS analytics on up to eight (8) channels, the HDCVI DVR delivers intelligent functions to monitor a scene for Tripwire violations, intrusion detection, and abandoned or missing objects. A device with IVS quickly and accurately responds to monitoring events in a specific area.

### Face Detection

The HDCVI DVR offers Face Detection of the first analog channel. This technology detects and captures a snapshot of a human face in a defined area within a scene.

### Smart Fan Design

The HDCVI DVR automatically turns on or turns off the fan according to the CPU temperature. This function reduces fan noise and helps to conserve electricity.

### Smart Search

Smart Search allows an operator to specify a region in the playback video to search for a motion detection event, saving time and manpower.



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

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## Technical Specification

### System

| | |
|---|---|
| Main Processor | Embedded Processor |
| Operating System | Embedded LINUX |

### Interface

| | X51A1E | X51A2E | X51A3E |
|---|---|---|---|
| Analog Camera Input | Four (4) Channels, BNC | Eight (8) Channels, BNC | 16 Channels, BNC |
| Preview Ability | Channel 1:<br>• 5 M-N at 20 fps or<br>• 4 M-N, 1080p, 720p at 30 fps<br>Other Channels:<br>• 4 M-N, 1080p, 720p at 30 fps | Channels 1 and 2:<br>• 5 M-N at 20 fps or<br>• 4 M-N, 1080p, 720p at 30 fps<br>Other Channels:<br>• 4 M-N, 1080p, 720p at 30 fps | |
| HDCVI | 5 MP, 4 MP, 1080p at 30 fps, 720p at 60 fps, 720p at 30 fps | | |
| AHD | 5 MP, 4 MP, 1080p at 30 fps, 720p at 30 fps | | |
| TVI | 5 MP, 4 MP, 1080p at 30 fps, 720p at 30 fps | | |
| CVBS | NTSC | | |
| IP Camera Input | 4 + 2 | 8 + 4 | 16 + 8 |
| Audio | | | |
| Input | Four (4) Channels, RCA | Eight (8) Channels, RCA | 16 Channels (use DB25 Audio Dongle) |
| Output | One (1) Channel, RCA | | |
| Two-way Talk | Reuse Audio In/Out, RCA | | |

### Recording

| | | X51A1E | X51A2E | X51A3E |
|---|---|---|---|---|
| Compression | | Smart H.265+, H.265, Smart H.264+, H.264 | | |
| Recording Resolution | | 5 M-N, 4 M-N (1280 x 1440), 1080p, 1080N, 720p, 960H, D1, CIF | | |
| Record Rate | Main Stream | Channel 1:<br>• 5 M-N at 10 fps<br>Channels 2 to 4:<br>• 4 M-N, 1080p at 15 fps<br>• 1080N, 720p, 960H, D1, CIF at 30 fps | Channels 1 and 2:<br>• 5 M-N at 10 fps<br>Channels 3 to 8<br>• 4 M-N, 1080p at 15 fps<br>• 1080N, 720p, 960H, D1, CIF at 30 fps | Channels 1 and 2:<br>• 5 M-N at 10 fps<br>Channels 3 to 16:<br>• 4 M-N, 1080p at 15 fps<br>• 1080N, 720p, 960H, D1, CIF at 30 fps |
| | Sub Stream | D1 or CIF at 15 fps | | |
| Maximum Incoming Bandwidth | | 24 Mbps | 48 Mbps | 96 Mbps |
| Bit Rate | | 32 Kbps to 6144 Kbps per Channel | | |
| Record Mode | | Manual, Schedule (Regular, Continuous), MD (Video Detection: Motion Detection, Video Loss, Tampering), Alarm, Stop | | |
| Record Interval | | 1 to 60 minutes (default: 60 minutes), Pre-record: 1 s to 30 s, Post-record: 10 s to 300 s | | |
| Audio Compression | | AAC (first channel only), G.711A, G.711U, PCM | | |
| Audio Sample Rate | | 8 KHz, 16 bits per Channel | | |
| Audio Bit Rate | | 64 Kbps per Channel | | |

### Display

| | X51A1E | X51A2E | X51A3E |
|---|---|---|---|
| Interface | One (1) HDMI (3840 x 2160)<br>One (1) VGA (1920 x 1080) | | |
| Native Output Resolution | 1920 x 1080, 1280 x 1024, 1280 x 720 | | |
| Maximum Decoding | | | |
| X51A1E | 4 Channels of 1080p at 7 fps<br>4 Channels of 720p at 15 fps<br>4 Channels of 960H at 30 fps | | |
| X51A2E | 8 Channels of 4 M-N at 15 fps<br>8 Channels of 1080N at 30 fps<br>4 Channels of 4 M-N at 30 fps | | |
| X51A3E | 16 Channels of 4 M-N at 15 fps<br>16 Channels of 1080p at 15 fps<br>4 Channels of 4 M-N at 30 fps | | |
| Multi-screen Display | | | |
| IP extension mode disabled | 1/4 | 1/4/8/9 | 1/4/8/9/16 |
| IP extension mode enabled | 1/4/6 | 1/4/8/9/16 | 1/4/8/9/16/25 |
| On-screen Display | Camera Title, Time, Video Loss, Camera Lock, Motion Detection, Recording | | |

### Network

| | X51A1E/X51A2E | X51A3E |
|---|---|---|
| Interface | One (1) RJ45 (100 Mbps) Port | One (1) RJ45 (1000 Mbps) Port |
| Network Function | HTTP, TCP/IP, IPv4/IPv6, UPnP, RTSP, UDP, SMTP, NTP, DHCP, DNS, IP Filter, PPPoE,DDNS, FTP, Alarm Server, P2P, IP Search (Supports Dahua IP cameras, DVRs, NVS) | |
| Maximum User Access | 128 Users | |
| Mobile Operating System | IOS, Android | |
| Interoperability | ONVIF 16.12, CGI Conformant | |

### Video Detection and Alarm

| Alarms | X51A1E/X51A2E | X51A3E |
|---|---|---|
| Trigger Events | Recording, PTZ, Tour, Video Push, Email, FTP, Snapshot, Buzzer and Screen Tips | |
| Video Detection | Motion Detection, MD Zones: 396 (22 × 18), Video Loss, Tampering and Diagnosis | |
| Alarms | | |
| Input | Eight (8) Channels | 16 Channels |
| Output | Three (3) Channels | Three (3) Channels |

### Playback and Backup

| | X51A1E | X51A2E | X51A3E |
|---|---|---|---|
| Playback | 1/4 | 1/4/9 | 1/4/9/16 |
| Search Mode | Time/Date, Alarm, MD and Exact Search (accurate to 1 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, and Digital Zoom | | |
| Backup Mode | USB Device/Network | | |


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## Storage

| | |
|---|---|
| Internal HDD | One (1) SATA Ports, up to 10 TB capacity for each disk |

## Auxiliary Interface

| | X51A1E/X51A2E | X51A3E |
|---|---|---|
| USB | Two (2) USB 2.0 Ports | One (1) USB 2.0 Port<br>One (1) USB 3.0 Port |
| RS485 | One (1) Port for PTZ Control | |

## Electrical

| | X51A1E/X51A2E | X51A3E |
|---|---|---|
| Alarms | | |
| Power Supply | 12 VDC, 2 A | |
| Power Consumption | < 10 W, without HDD | < 15 W, without HDD |

## Construction

| | X51A1E | X51A2E | X51A3E |
|---|---|---|---|
| Dimensions | 1U, 325.0 mm x 255.0 mm x 55.0 mm<br>(12.80 in. x 10.04 in. x 2.17 in.) | | |
| Net Weight, without HDD | 1.10 kg (2.40 lb) | 1.20 kg (2.60 lb) | 1.3 kg (2.90 lb) |
| Gross Weight | 1.80 kg (4.0 lb) | 1.90 kg (4.20 lb) | 2.20 kg (4.90 lb) |
| Installation | Desktop | | |

## Environmental

| | |
|---|---|
| Operating Temperature | –10° C to +55° C (+14° F to +131° F), 10% to 90% RH |
| Storage Temperature | –20° C to +70° C (–4° F to +158° F), 0% to 90% RH |

## Certifications

| | |
|---|---|
| Safety | UL 60950-1 |
| Electromagnetic Compatibility (EMC) | FCC Part 15 Subpart B ICES 003 Issue 6<br>EN 55032<br>EN 50130<br>EN 61000-3-2<br>EN 61000-3-3 |
| Immunity | EN 55024 : 2010 |

## Intelligence

The IVS features are operational only when the additional IP channel feature is not active. The HDCVI DVR supports only IVS or the additional IP channel inputs, both features cannot be in use simultaneously.
IVS triggers an alarm and takes a defined action for the following events:

Premium Features
Channels 1 and 2: Support all Premium IVS Features
Channels 3 through 8: Support Tripwire and Intrusion Premium IVS Features

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

Advanced Feature
Available on Analog Channel 1
(feature not available if an IP camera is connected as Camera 1)

| | |
|---|---|
| Face Detection | Detects and captures a snapshot of a human face in a defined area within a scene. |

## Ordering Information

| Type | Part Number | Description |
|---|---|---|
| 4-channel HDCVI DVR | X51A1E | 4 Analog/CVI Inputs, 4 + 2 IP Inputs,<br>8 Alarm Inputs, 3 Alarm Outputs |
| | X51A1E1 | 4 Analog/CVI Inputs, 4 + 2 IP Inputs, 1 TB HDD,<br>8 Alarm Inputs, 3 Alarm Outputs |
| | X51A1E2 | 4 Analog/CVI Inputs, 4 + 2 IP Inputs, 2 TB HDD,<br>8 Alarm Inputs, 3 Alarm Outputs |
| 8-channel HDCVI DVR | X51A2E | 8 Analog/CVI Inputs, 8 + 4 IP Inputs,<br>8 Alarm Inputs, 3 Alarm Outputs |
| | X51A2E1 | 8 Analog/CVI Inputs, 8 + 4 IP Inputs, 1 TB HDD,<br>8 Alarm Inputs, 3 Alarm Outputs |
| | X51A2E2 | 8 Analog/CVI Inputs, 8 + 4 IP Inputs, 2 TB HDD,<br>8 Alarm Inputs, 3 Alarm Outputs |
| 16-channel HDCVI DVR | X51A3E | 16 Analog/CVI Inputs, 16 + 8 IP Inputs,<br>16 Alarm Inputs, 3 Alarm Outputs |
| | X51A3E1 | 16 Analog/CVI Inputs, 16 + 8 IP Inputs, 1 TB HDD,<br>16 Alarm Inputs, 3 Alarm Outputs |
| | X51A3E2 | 16 Analog/CVI Inputs, 16 + 8 IP Inputs, 2 TB HDD,<br>16 Alarm Inputs, 3 Alarm Outputs |



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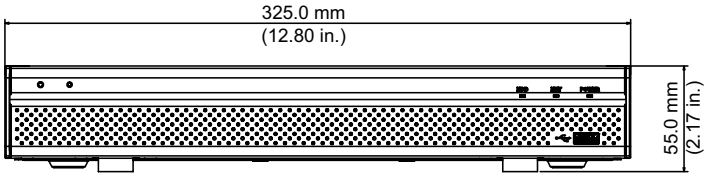
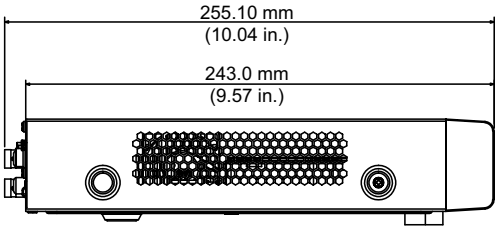
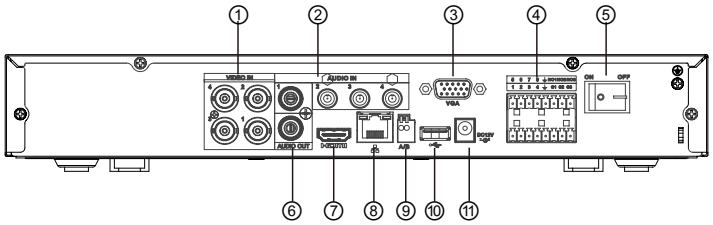
## Dimensions (mm/in.)



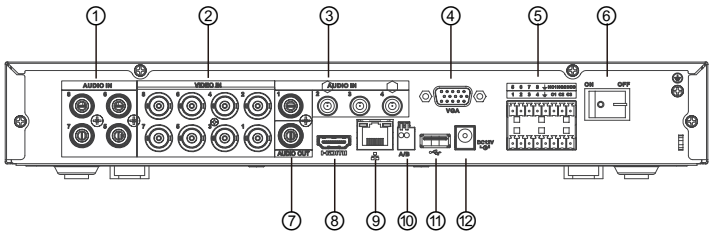

## Rear Panel

X51A1E



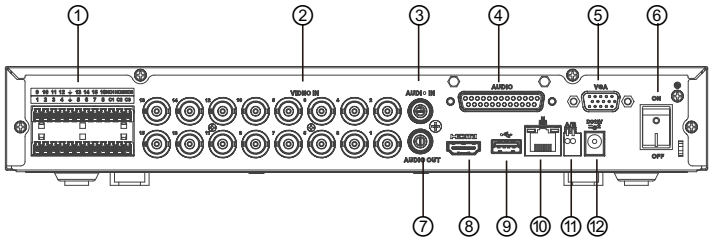

| | | | |
|---|---|---|---|
| 1 | Video IN, BNC x 4 | 7 | HDMI OUT |
| 2 | Audio IN, RCA x 4 | 8 | Network Port |
| 3 | VGA OUT | 9 | RS485 Port |
| 4 | Alarm I/O | 10 | USB Port |
| 5 | Power Switch | 11 | 12 VDC Power IN |
| 6 | Audio OUT, RCA x 1 | | |

X51A2E




| | | | |
|---|---|---|---|
| 1 | Audio IN, channels 6 to 8, RCA x 4 | 7 | Audio OUT, RCA x 1 |
| 2 | Video IN, BNC x 8 | 8 | HDMI Port |
| 3 | Audio IN, channels 1 to 4, RCA x 4 | 9 | Network Port |
| 4 | VGA OUT | 10 | RS485 Port |
| 5 | Alarm I/O | 11 | USB Port |
| 6 | Power Switch | 12 | 12 VDC Power IN |

X51A3E




| | | | |
|---|---|---|---|
| 1 | Alarm I/O | 7 | Audio OUT, RCA x 1 |
| 2 | Video IN, BNC x 16 | 8 | HDMI Port |
| 3 | Audio IN, channel 1, RCA x 4 | 9 | USB Port |
| 4 | Audio IN, channels 2 to 16 (use DB25 Audio Dongle) | 10 | Network Port |
| 5 | VGA OUT | 11 | RS485 Port |
| 6 | Power Switch | 12 | 12 VDC Power IN |

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