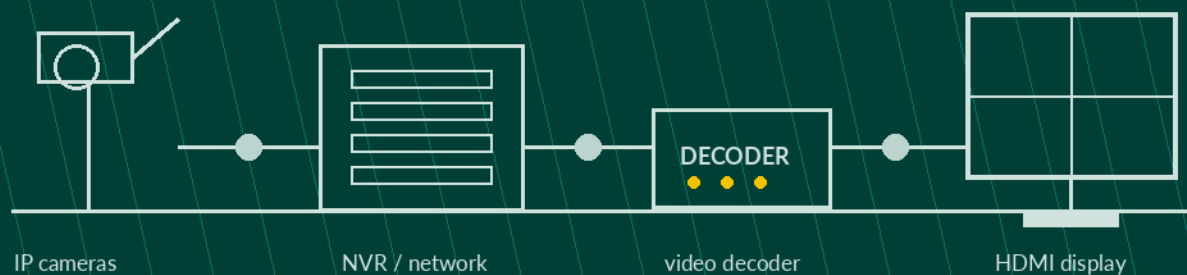


ACTi

Physical Security End-to-End Solution Provider

White Paper | Decoders

DECODERS FOR IP VIDEO SURVEILLANCE



A practical guide to converting IP video streams into reliable, operator-ready live displays for security monitoring.

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Document purpose

This white paper explains how network video decoders convert digital video and audio streams from IP cameras, encoders, or recording platforms into signals that can be shown on dedicated monitors. It focuses on the system-design decisions that determine whether a decoder-based display is dependable, secure, easy to operate, and maintainable.

It is written for system integrators, consultants, and end users planning live monitoring for security desks, reception areas, inspection points, hospitals, airports, industrial facilities, retail sites, warehouses, campuses, and control rooms.

The document references ACTi public information about decoder functions, features, architecture, and applications. It intentionally avoids product model names so the guidance remains useful as product generations change.

Reading guide

Use Sections 3 and 4 to define the decoder role and technical concepts, Section 5 to map high-value applications, Section 6 to review system architecture, Section 7 to align decoder product categories with project needs, and Section 8 to collect terminology for proposals, tender documents, and stakeholder alignment.

1. Executive Summary

A video decoder receives compressed digital video streams over an IP network, decodes them, arranges one or more views, and outputs video - and, where supported, audio - to a local display. ACTi describes decoders as a way to convert streams from cameras or encoders into signals viewable on HDMI- or coaxial-connected screens. [1]

The decoder is useful when a site needs a reliable, always-on live view without deploying a full operator workstation at every display. It can receive streams directly from cameras in smaller systems or from a network video recorder in medium and large architectures. Unlike an NVR, the decoder is primarily a display endpoint and can offload display processing from recording servers or workstations. [1]

ACTi public information lists capabilities that may be available by product class, including screens and streams up to 4K, full-frame-rate display, up to 16 concurrent channels, secure transmission, digital I/O, two-way audio, ONVIF support, API/SDK integration, HDMI and BNC outputs, and multiple mounting options. [1]

Core message

Decoder value is created by the complete display path

The best result comes from matching source streams, codecs, resolution, frame rate, channel count, network security, output interface, monitor capability, layout, operator viewing distance, and lifecycle testing - not from selecting the decoder in isolation.

Key takeaways

- A decoder is a dedicated live-view appliance, not a substitute for the recording, search, evidence export, and incident-management functions of an NVR or VMS.
- Decoder capacity must be evaluated as a combination of channel count, stream resolution, codec, frame rate, layout, audio, and output resolution.
- Direct-camera designs simplify temporary or small installations; recorder-fed designs provide centralized stream control for larger systems.
- HDMI, coaxial output, display resolution, cable length, mounting, and viewing distance are part of the system requirement.
- Cybersecurity and maintainability require secure accounts, HTTPS where supported, VLAN/firewall controls, time synchronization, firmware control, and acceptance testing.

Procurement principle

Specify the intended live-view outcome, stream sources, simultaneous channels, codec and resolution mix, display output, monitor layout, network controls, mounting environment, integration functions, acceptance tests, and replacement rules together.

2. About ACTi Corporation

ACTi Corporation is the writer and publisher of this document. ACTi is a Taiwan-based international company founded in 2003 and serving customers in more than 100 countries. ACTi states that it has more than 20 years of experience in the security industry and has pioneered video-based security technology development and innovation. [2]

ACTi positions itself as a physical security end-to-end solution provider. Its ecosystem includes video surveillance, access control, control-center operation, system management, system health management, AI-enabled technologies, and third-party integration. [2]

This ecosystem is relevant to decoder projects because a local monitor is only one point in the operational chain. The broader system must preserve usable live video, recording reliability, event handling, permissions, evidence access, health status, and maintenance responsibility.

Why ACTi is relevant to decoder projects

ACTi strength	Project relevance
End-to-end security scope	Cameras, encoders, recording platforms, central management, TV-wall operation, access control, analytics, and health management can be planned as one architecture.
Video as the foundation	A decoder is valuable only when source video remains clear, timely, correctly composed, and usable by the operator.
Integration capability	Network streams, alarms, I/O, audio, APIs, and third-party systems can be considered in the same project design.
Project and documentation fit	System integrators can align device categories, output requirements, cybersecurity settings, accessories, testing, and handover records.

3. Definition of Decoders

A network video decoder is a purpose-built device that receives one or more compressed IP video streams, reconstructs the video frames, optionally decodes audio, composes the selected viewing layout, and converts the result into a display signal for a monitor or television.

The source can be an IP camera, a video encoder, or an NVR/VMS stream. The output is commonly HDMI and may also include a coaxial video connection, depending on product class. A decoder can provide a static grid, sequence, or selected full-screen view without the keyboard, mouse, operating system, and general-purpose graphics workload of a PC workstation. [1]

The decoder should not be confused with a video encoder. An encoder converts analog or local video into an IP stream; a decoder performs the reverse operation for display. It should also not be confused with an NVR, whose primary role is recording, indexing, playback, search, and evidence management.

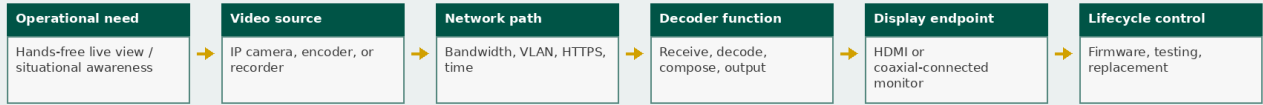
Decoder vs. related system components

Component	Primary role	Common misunderstanding
Video decoder	Receives compressed network streams and outputs a monitor-ready signal.	It does not automatically provide the full recording and investigation workflow of an NVR/VMS.
Video encoder	Converts analog or local video/audio into an IP stream.	It sends video into the network rather than producing the final display output.
NVR / VMS	Records, manages, searches, plays back, exports, and distributes video.	A video output from a recorder is not always the most efficient way to serve every local monitor.
Operator workstation	Provides interactive live view, playback, alarms, maps, investigation, and administration.	A hands-free monitor may not need a full workstation or user interface.
Display / TV panel	Presents the decoder output at the required size and resolution.	A 4K display alone does not guarantee that every source stream is decoded at 4K.

Visual Concept

How decoders support practical live surveillance displays

The complete path must preserve stream compatibility, image quality, security, and operator usability.



Key question: can the selected decoder display the required streams continuously, securely, and at the intended quality?

Design note

Decoder performance must be evaluated across the complete signal path: camera or recorder stream, codec, resolution, frame rate, channel count, network latency, multicast or unicast behavior, secure transmission, decoder resources, layout, output resolution, cable path, monitor settings, and viewing distance.

Practical deployment interpretation

In a hospital, airport, retail store, gatehouse, warehouse, school, industrial site, or public facility, the local monitor may need to operate continuously with minimal interaction. The design should protect situational awareness without creating a second unmanaged computer endpoint or weakening access control and cybersecurity.

4. Core Technical Concepts

Decoder projects should begin with the intended display outcome and operating environment. The goal is not merely to prove that a stream opens; it is to provide predictable, continuous live viewing at the required quality and latency while preserving network security and maintainability.

Concept	Practical meaning
Decode capacity	Evaluate simultaneous channels together with codec, resolution, frame rate, bit rate, stream profile, audio, and layout. Maximum channel count may be lower when higher-resolution or higher-frame-rate streams are used.
Codec compatibility	Confirm the source and decoder share the required compression format. H.264 is common; some decoder classes also support H.265. [1]
Output and display	Match HDMI or coaxial output, output resolution, refresh rate, aspect ratio, monitor input, cable distance, and any extender or converter.
Stream source	Choose direct camera streams for simple systems or recorder-distributed streams for centralized configuration and larger deployments.
Network behavior	Plan bandwidth, latency, packet loss, VLAN, multicast/unicast use, QoS where needed, firewall rules, HTTPS where supported, and time synchronization.
Layouts and operation	Define full-screen, grid, sequence, fixed channel assignment, restart behavior, credentials, user access, and hands-free operation.
Integration functions	Confirm ONVIF, API/SDK, digital input/output, audio, event actions, and third-party control only where the project requires them. [1]
Acceptance and lifecycle	Test cold start, network interruption, stream recovery, display restoration, continuous operation, firmware upgrade, replacement, and documentation.

Specification interpretation

A decoder can appear compatible but still fail the project if the tested stream differs from the deployed stream, a 4K output is assumed to equal 4K decoding for every tile, the monitor negotiates an unexpected resolution, passwords expire without an operational process, the device does not recover after a network interruption, or the cable path exceeds the reliable output distance.

Capability Matrix

Project requirement	What can go wrong	Capabilities to specify	Operational output
Hands-free local monitoring	A PC workstation is used only to show a fixed grid, adding maintenance and user-interface risk.	Dedicated decoder, fixed layout, auto-start, stream recovery, secure credentials.	Continuous live view with minimal operator interaction.
High-resolution display	The monitor is 4K, but streams, decoder resources, layout, or cable path cannot sustain the intended detail.	Output resolution, stream mix, frame rate, codec, HDMI capability, cable/extension plan.	Predictable image quality at the actual viewing distance.
Multi-channel view	Nominal channel count is met, but performance falls when all streams are active.	Simultaneous decode test using the real codec/resolution/frame-rate combination.	Stable grid without dropped or frozen tiles.
Secure deployment	Default accounts, open network paths, or unencrypted management create unnecessary exposure.	Unique accounts, HTTPS where supported, VLAN, firewall, restricted administration, firmware policy.	Lower cyber risk and clearer ownership.
Alarm and I/O integration	The display is expected to switch views or trigger external devices, but event logic is not tested.	Digital I/O, API/SDK, event mapping, audio behavior, fail-safe states, acceptance cases.	Faster visual verification and controlled response.
Long-term lifecycle	Replacement or firmware changes alter stream behavior or output negotiation.	Version records, compatibility retest, spare strategy, configuration backup, handover package.	Maintainable operation over the system lifecycle.

How to use this matrix

Use the matrix during site survey, proposal design, and proof-of-concept testing. Each requirement should become a measurable test using the actual camera or recorder streams, monitor type, cable path, network conditions, credentials, layouts, and restart scenarios.

For tender writing, define the purpose of each display first. Then specify source streams, simultaneous channels, codec/resolution/frame-rate mix, output interface, monitor capability, cybersecurity baseline, mounting, environment, continuous-operation behavior, and handover documentation.

5. High-Value Applications

Decoders are most valuable where personnel need a simple, dedicated, always-visible overview of live security video. ACTi public examples include hospital service-desk monitoring and airport security-inspection monitoring; its decoder page also describes retail monitoring and use within small, medium, and large surveillance architectures. [1]

Application	Operational value	Typical locations
Hospital service desk	Give nurses or reception staff a hands-free view of lobbies, corridors, entrances, and selected public areas.	Reception, nurse station, security desk.
Airport inspection area	Provide officers with an overview of inspection lanes, queues, and adjacent activity while they remain focused on screening tasks.	Security inspection, baggage handling, checkpoint support.
Retail deterrence and awareness	Show selected live views on a visible panel to reinforce security presence and help staff monitor entrances or service areas.	Store entrance, checkout zone, service counter.
Gatehouse and reception	Display approaching vehicles, visitor entrances, loading areas, or intercom-related cameras without a full workstation.	Corporate campus, warehouse gate, residential reception.
Industrial and logistics local view	Provide line-of-sight monitoring for yards, docks, restricted zones, or operating areas near the responsible team.	Factory, warehouse, logistics yard, utility facility.
Control-room auxiliary display	Offload fixed live grids or status views from operator workstations while interactive tasks remain on VMS/CMS clients.	Security operations center, dispatch room, multi-site control room.

Value by stakeholder

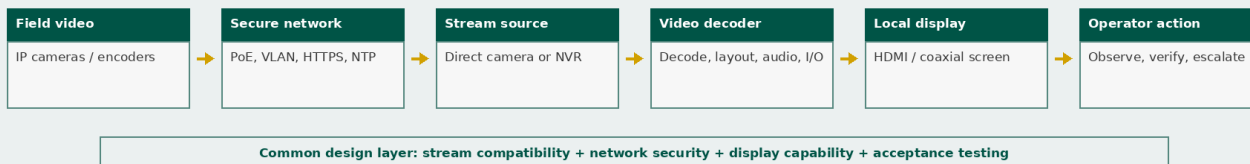
Stakeholder	Main benefit
System integrator	A clear design pattern for delivering dedicated live displays without unnecessary workstation cost and complexity.
Consultant	Measurable specification language for capacity, output, cybersecurity, recovery, testing, and lifecycle control.
Security manager / operator	Reliable situational awareness with fewer controls to manage at fixed monitoring points.
IT / cybersecurity team	A smaller-purpose endpoint that can be segmented, hardened, documented, and managed as part of the security network.

6. System Architecture

A decoder-based display should be designed as a complete architecture. The decoder sits between network video sources and the local screen, but reliable operation depends on camera settings, recorder stream distribution, network controls, display output, physical mounting, and operator procedures.

Reference architecture for decoder-based live monitoring

A decoder converts network video into a dedicated local display without requiring a full operator workstation.



Architecture layers

Layer	Role in decoder-based surveillance
Field layer	Camera location, lens, image quality, lighting, IR/WDR, audio if needed, and stream configuration.
Network layer	PoE for source devices, switching, VLANs, bandwidth, latency, HTTPS where supported, firewall policy, NTP, and surge protection.
Source-management layer	Direct camera streams or recorder-distributed streams, credentials, channel naming, substream/main-stream selection, and change control.
Decoder layer	Codec, simultaneous decode capacity, layout, sequence, audio, I/O, API/SDK, restart behavior, environmental range, and mounting.
Display layer	HDMI or coaxial connection, monitor resolution, aspect ratio, refresh rate, cable distance, VESA/site mounting, and viewing distance.
Operations layer	Operator SOP, alarm verification, escalation, health checks, configuration backup, firmware maintenance, and replacement process.

Architecture warning

A decoder system can still underperform if the source stream is changed after acceptance, the output negotiates the wrong resolution, the monitor is too small or too far from the viewer, network interruption recovery is untested, or configuration ownership is unclear.

7. ACTi Product Portfolio Overview

ACTi positions its decoder portfolio for live monitoring on dedicated screens. Its public decoder page describes options that can receive streams directly from cameras or through an NVR and participate in small, medium, or large architectures. Publicly listed feature categories include 4K screen and stream support, full frame rate, extended operating temperature, secure transmission, digital I/O, two-way audio, ONVIF support, API/SDK integration, HDMI/BNC outputs, up to 16 concurrent channels, and surface, pole, or VESA mounting - depending on product class. [1]

This section intentionally describes product types and functional categories rather than specific model names so the white paper remains usable as individual products and part numbers change.

Portfolio categories

Category	Where it fits	Use-case fit
Compact fixed-view network decoder	Dedicated single-display live view for a small number of cameras or a fixed multi-view grid.	Reception, service desk, gatehouse, small retail site.
Multi-channel high-resolution decoder	Larger grids and higher-resolution output where multiple simultaneous streams must be shown on a 4K-capable screen.	Inspection area, warehouse, campus, control-room auxiliary display.
Extended-temperature decoder	Local display endpoint for environments outside normal office temperature ranges.	Semi-outdoor cabinet, industrial or transportation environment.
Integration-oriented decoder	Projects requiring audio, digital I/O, ONVIF, API/SDK, or event-controlled display behavior.	Alarm verification, intercom-related monitoring, custom control integration.
Flexible-output and mounting decoder	Projects requiring HDMI or coaxial output and surface, pole, or VESA installation.	Wall display, desk display, equipment cabinet, retrofit installation.

Portfolio-level capabilities to confirm

- Required simultaneous channels, codec, stream resolution, frame rate, bit rate, and main-stream/substream behavior.
- Output type and resolution, monitor compatibility, cable path, extenders/converters, mounting, and environmental limits.
- Secure transmission, account control, network segmentation, firmware policy, time synchronization, and remote administration.
- ONVIF, API/SDK, two-way audio, digital I/O, event switching, and third-party integration only where required.
- Compatibility with current camera/encoder/NVR streams, configuration backup, recovery behavior, accessories, regional availability, and acceptance evidence.

Project note

Product availability, detailed specifications, integration scope, accessories, firmware, and regional part numbers should be confirmed from the latest ACTi product pages, datasheets, release notes, installation guides, and quotation documents before project submission.

8. Related Keywords and Terminology

The following reference groups collect common terms related to video decoders, IP surveillance display architecture, stream compatibility, cybersecurity, system integration, and project planning.

Core topic keywords

video decoder, network video decoder, IP video decoder, surveillance decoder, security video display, dedicated live-view appliance, decoder-based monitoring, hands-free surveillance monitor, local security display

Video and codec keywords

H.264 decoding, H.265 decoding, compressed video stream, IP camera stream, encoder stream, NVR stream, RTSP stream, video bit rate, frame rate, main stream, substream, low-latency video

Display and output keywords

HDMI output, BNC output, coaxial video output, 4K display, 4K video stream, multi-channel grid, full-screen view, video sequence, aspect ratio, refresh rate, monitor resolution, display negotiation, HDMI extender, VESA mount

Network and cybersecurity keywords

HTTPS transmission, ONVIF support, VLAN, firewall, network segmentation, secure account, password policy, NTP time synchronization, firmware management, device hardening, stream authentication, multicast, unicast, QoS

Integration keywords

API integration, SDK integration, digital input, digital output, relay output, two-way audio, alarm-triggered display, event-controlled layout, camera-to-decoder, NVR-to-decoder, third-party integration

Project design keywords

decoder capacity calculation, simultaneous channels, codec compatibility, resolution and frame rate matrix, proof of concept, acceptance testing, stream recovery, auto-start live view, continuous operation, configuration backup, lifecycle replacement

Application keywords

hospital service desk monitor, airport inspection monitor, retail security display, gatehouse camera monitor, reception live view, warehouse monitoring screen, industrial local display, control-room auxiliary display, public-area surveillance

Common Question Phrases

what is a video decoder, how does an IP video decoder work, video decoder vs NVR, video encoder vs decoder, when to use a surveillance decoder, how many cameras can a decoder display, how to display IP cameras on a TV, how to connect an NVR to a decoder, how to choose a 4K video decoder, how to calculate decoder capacity, how to test decoder stream compatibility, how to secure a network video decoder, how to recover live view after network interruption, how to specify a decoder for a tender

Source notes

Ref.	Source
[1]	ACTi Corporation, "Decoders," official product category page. URL: https://www.acti.com/products/decoders . Accessed: July 17, 2026.
[2]	ACTi Corporation, "About ACTi," official corporate page. URL: https://www.acti.com/corporate . Accessed: July 17, 2026.
[3]	ACTi Corporation, "ONVIF Conformant Products White Paper," uploaded layout reference. Used for document structure, visual hierarchy, page composition, and styling consistency.

Revision note

Revision note

This document is a marketing and technical education white paper. It is not a final project design, cybersecurity audit, interoperability certification, legal opinion, or guarantee of compatibility. Validate current product specifications, stream formats, firmware, output interfaces, monitor behavior, cable distances, network conditions, cybersecurity policy, accessories, and operator workflow in the target environment before deployment.

Prepared by ACTi Corporation

For decoder projects, confirm source stream requirements, simultaneous channels, codec/resolution/frame-rate mix, display output, monitor capability, cybersecurity controls, mounting, environmental conditions, and regional availability with your ACTi sales contact or authorized system integrator.

sales@acti.com | www.acti.com