

Live Video Production

Technology and techniques for professional quality live video productions



The rise of live video streaming

The rise of video communication, particularly live streaming, is driving the advancement of professional standard live video production technology that is easier to use and more accessible. It's now an everyday expectation that remote audiences join all manner of events or catch up on a recording at a time that suits them.

Applications for live video production are now vast. They include:

- Education
- Corporate
- Legal
- Government
- Churches and ceremonies
- Live events

Video producers now demand a standard of live production that has traditionally only been possible using dedicated live broadcast production facilities, such as an outside broadcast truck used by television stations.

So, how do you achieve live event production that is dynamic and incredibly efficient? It takes planning, robust workflows and the right equipment.

Helping you make good choices

Regardless of the nature of your business, your intended application or your level of technical expertise, your choice of technology and approach to live video production is critical.

This document outlines the key technologies and practices that you should consider. This is the place to start your live video production journey.



The possibilities of live video production

1. Live video production saves time

The need for video post-production is removed. Switching video sources, titles and graphics, and professional standard audio are processed in real time.

2. Live video production saves money

Hiring a professional live-production crew is incredibly expensive and out of reach for many businesses. There are more straightforward and cost-efficient ways to produce professional-quality live video streams.

With good planning and suitable equipment, you can unlock incredible video production opportunities for your business, including:

- Expanding audience reach for your services/products
- Ability to generate on-the-spot feedback
- Possible revenue streams
- Ramp up video content with live events, how-tos and live Q&As

The opportunities are endless if you arm yourself with the right video production tools.

Essential elements of live production

Let's start by breaking down the various technical requirements of a high-quality live-streaming production:

- The switching of two or more sources of vision, including cameras, computers, videoconferencing inputs (such as Microsoft Teams or Zoom), and pre-recorded content.
- Adding graphical elements, such as titles, graphics and closed captions.
- Switching the various video formats being used in the production into a standard stream format.
- The ability to output multiple video feeds to a live on-site audience and the live broadcast audience.
- The capability to record the live feed or a dedicated version of the production.

Users also expect seamless compatibility:

- Streaming platforms, content delivery networks and content management systems such as YouTube and Facebook Live, Panopto, Kaltura, StreamShark, and AWS
- Video input connectivity such as HDMI, SDI and LAN
- Video streaming protocols such as SRT, HLS and RTMP/RTMPS



Software vs Hardware

At the heart of live video production systems is the encoder. Video from most sources must be converted or encoded to a format compatible with the appropriate streaming service.

There are two ways to encode audio/video content and convert it into data streams – hardware or software encoders. It's a choice that has significant implications for your workflows, budget and prospects of success.

Software encoders and hardware encoders can mean different things to different people. For that reason, let's start by clarifying the definitions.

- A software encoder is a streaming or recording application that works on a general-purpose computer running an operating system like Windows or macOS. Some popular examples are streaming software like OBS Studio, vMix and Streamlabs.
- A hardware encoder is a standalone device that's purpose-built for live streaming and video recording. Epiphan Pearl-2, Pearl Mini, and Pearl Nano are a few such devices on the market.

Next, we'll take a look at the differences.



The Software encoding option

When it comes to software encoding, the choice is abundant. Many software applications will encode video and audio using a notebook or desktop computer.

For simple streaming, the cost is an advantage. You can use your existing computer, webcam and microphone. OBS, for example, is an open-source encoder that is free to use.

However, the cost equation is less clear for professional production where video quality is paramount and multiple cameras are involved. To match the performance of a hardware encoder out of the box, you can easily spend as much or more on computer upgrades, add-ons and adapters.

The Hardware encoding option

Hardware encoders set the standard. The advantages they bring are often essential for professional-level productions.

Hardware encoders have an edge in four key areas:

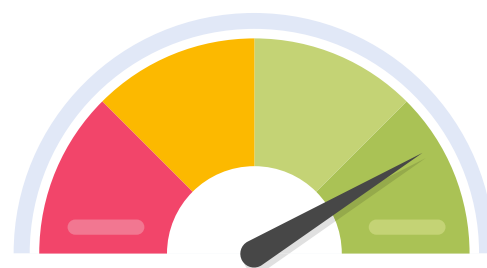
- Performance
- Flexibility
- Reliability
- Serviceability



Hardware encoders provide superior performance

A hardware encoder will generally run more smoothly than a computer built with general-purpose parts. This point is magnified when handling multiple high-end sources or simultaneously sending content to various streaming platforms. That's because hardware encoders are explicitly designed for streaming and recording. Every component and its operating firmware are selected or designed specifically for the task, as is all processing power.

Likewise, the underlying firmware is fine-tuned for live streaming and recording, which is possible because there's no need for a hardware encoder to do anything else.



Hardware encoders are more flexible

Most hardware encoders support multiple video inputs that let you directly connect the broadest range of professional standard video and audio sources and their various forms of connectivity.

With the necessary inputs built into the video encoder, connecting every device is more straightforward. By comparison, software-encoder setups tend to be limited to USB, restricting the range of compatible devices.

While capture cards and audio interfaces can deliver non-USB signals into your computer, this adds more components and cables. Each one is a potential point of failure, complication and cost.



Hardware encoders are more reliable

Imagine this: you're at the helm of a major production. Then suddenly, the screen turns blue, and you're presented with a horrifying error message. This scenario is a genuine possibility when using a software encoder because many other processes and programs run alongside your streaming application, driving up your CPU usage.

Compare this to a hardware encoder built from the ground up for streaming and recording. The same goes for the underlying software, which means there are no competing or extraneous processes. That's not to say hardware encoders never experience hiccups, but it's far less likely.



Hardware encoders are easier to service and support

Peripheral device compatibility is a common issue with general-purpose computers and one of the most complex to solve.

Hardware encoders are designed and assembled by a single manufacturer who acts as your one point of contact. It makes getting your system repaired or replaced a relatively pain-free process.



So, which is better?

Ultimately, it comes down to your budget, live streaming requirements and the production quality you want to achieve. If your requirement is to produce professional quality live video productions, hardware-based encoders take a lot of beating.

What to consider beyond encoding features

Aside from the type of encoding you select, it's essential to consider other elements that go into producing seamless live video productions.

Features, connectivity and compatibility vary widely, which will elevate you from simply streaming live video to creating a polished live production. It's vital to carefully consider your requirements before deciding which hardware or software encoder will suit you and your business.

Control and Simplicity

When it comes to producing live video – quality is paramount. There is no room for failure when live streaming for business purposes.

For this reason, it's worth thinking about investing in a professional live-streaming solution you can rely on to deliver a high-quality video stream that seamlessly supports your production.

No matter what segment or industry you're in, the live-streaming equipment you select should be simple to learn and make you feel completely in control during a live video stream. Your ability to develop repeatable processes and workflows to make live production simple is priceless.

Whether seamlessly switching from various sources and layouts or expertly adding graphics and headlines in real time – it's key to keep it as user-friendly as possible.

Making it more than just a video feed



The level of professional polish applied to your live stream makes a dramatic difference in its visual impact on your audience. The ability to create professional custom layouts will take your live video productions from good to great.

Custom layout features include:

- Easy PiP layouts – Make picture-in-picture, side-by-side, three-quarter, and other layouts for a dynamic and polished presentation
- Chroma key for green screens and graphics – Easily use green screen setups for background replacement and third-party titling software to bring rich animations and lower thirds into your productions
- Images and dynamic text – Customise the look and feel of your live stream or event with transparent PNG images, static or dynamic backgrounds, timestamps, text overlays and various other elements.

Planning and Workflows

So far, this document has focused on the technical features and capabilities of live streaming devices and software. Now let's look at the most critical operating aspects – planning and workflows.

Planning excellence is paramount in live video production because there are no second chances. It's all about being live.

With that in mind, aligning your production plan with the event is essential. Here is a simple pre-production checklist that you can use to produce your production plan.

Pre-production checklist

The basics should include:

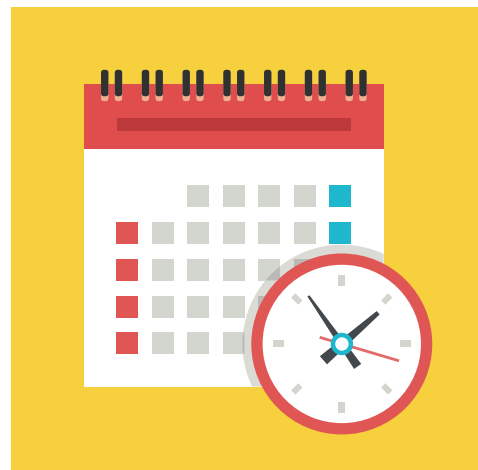
1. Event schedule
2. Camera locations
3. Chroma Key
4. Microphones and audio setup
5. Additional video and audio sources
6. Titles and graphics
7. Backup content – fallback content if something goes wrong



Production schedule

With all the basics understood, it's time to plan the production in detail. Pre-production decisions are likely to include:

- What content will be streamed before the start of the event and at its conclusion?
- What camera angles are used for each stage of the production?
- When are titles and graphics used in the feed?
- At what stages will other source content be included?
- For hybrid events, what content is shown to the live audience vs the streaming audience?
- What content will be recorded for later use?



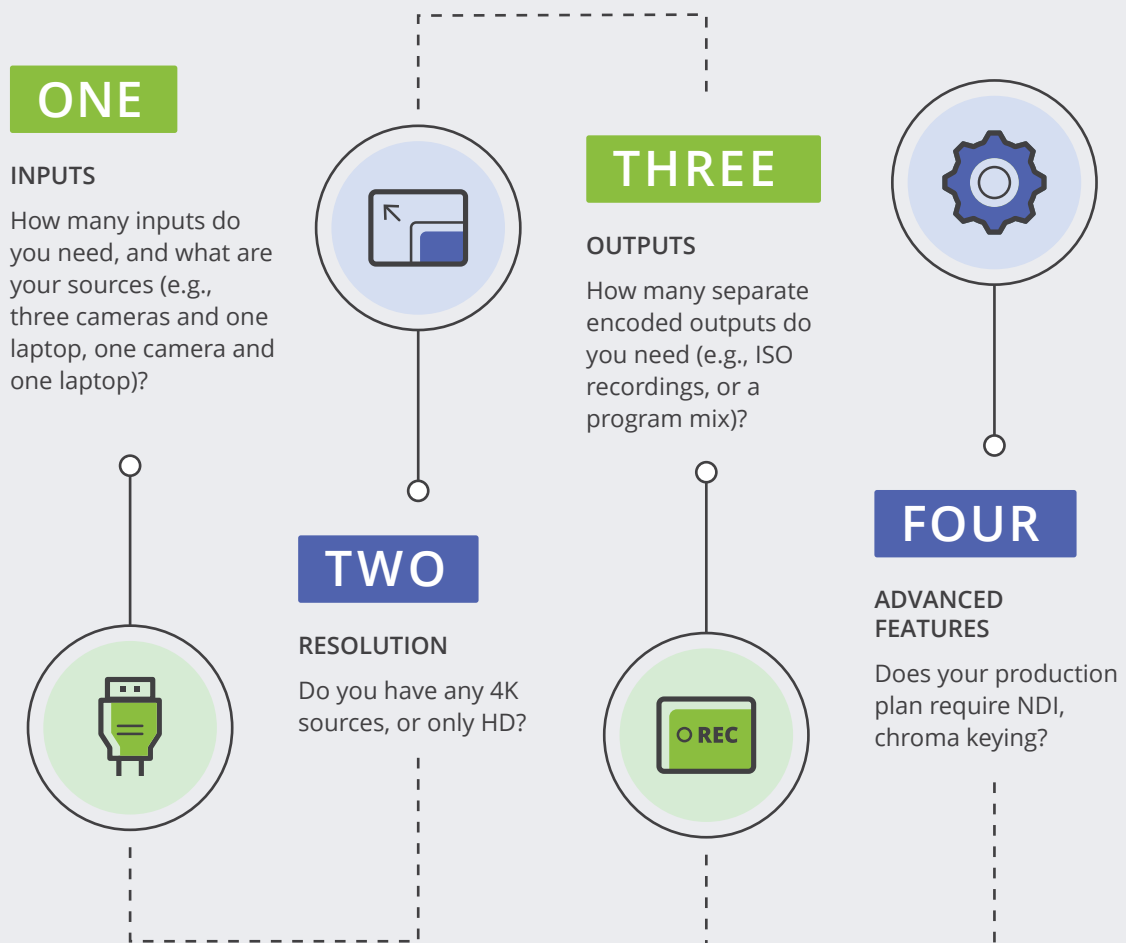
Workflows

Your workflow is the process you use for your live event production. Workflows allow you to familiarise yourself with each step by working in a particular way for any specific event format.

For more advanced productions with multiple sources, workflows will get you in an efficient and confident groove.

Workflows are where Epiphan Pearl excels. Custom layouts can be configured with the easy-to-use layout editor. It enables you to combine, crop and scale video sources to create dynamic, professional-quality layouts. Layouts can incorporate text overlays, graphics, green-screen setups and images. For even greater flexibility, the operator can define custom variables, such as adding GPS coordinates.

4 QUESTIONS FOR YOUR VIDEO PRODUCTION



Use case examples

A helpful overview of live video production requirements across various industries.



Live events



Education



Government



Legal



Corporate



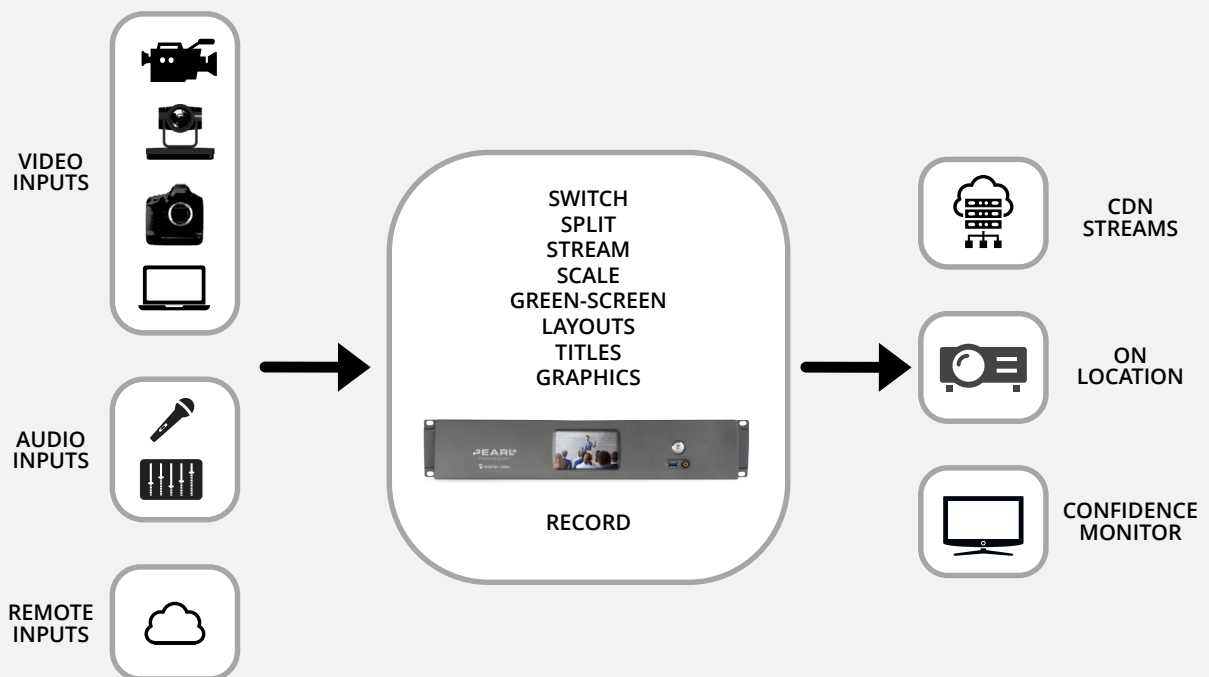
Religion

Live event production

There are no opportunities to start over in live event production. Production quality must be seamless every time. You need a reliable live video encoder built for maximum reliability, with centralised configuration and monitoring that keeps your fleet running flawlessly. Your live video solution should be scalable to suit various event types.

Examples:

- Hybrid events
- Arts and entertainment venues
- Corporate events
- Sports
- Production studios
- Virtual conferences.

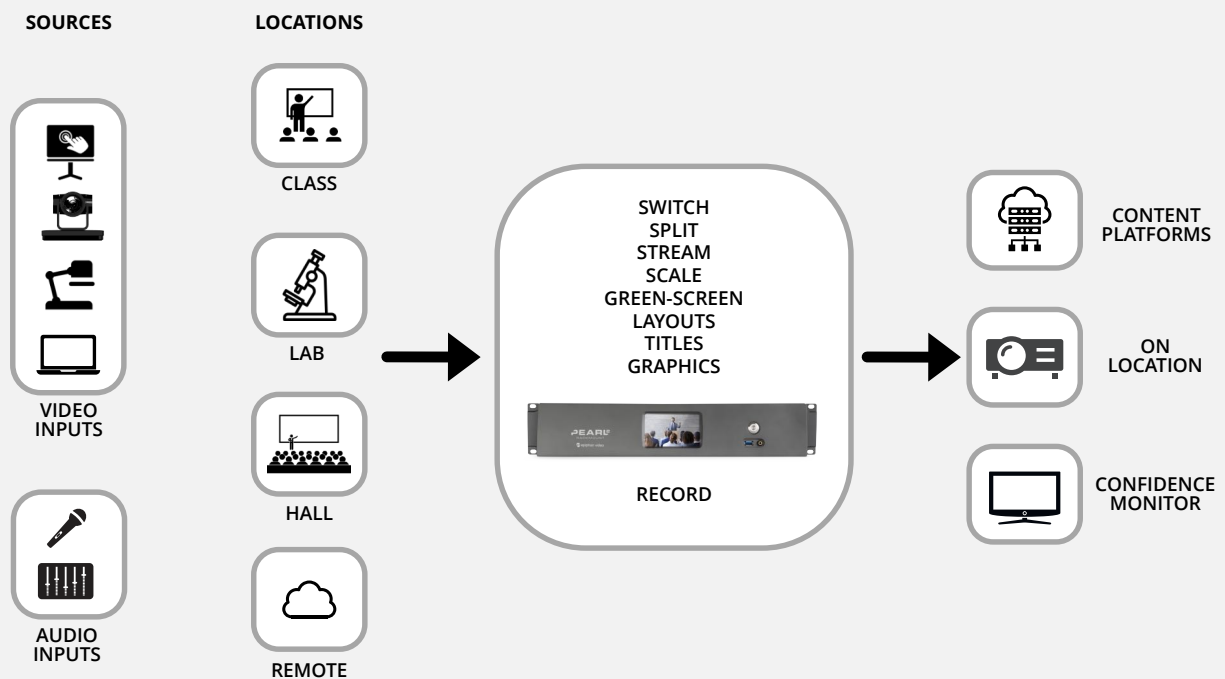


Education

Education campuses require a flexible and scalable solution for live lecture capture, online learning, hybrid education and more. The live video solution should be low maintenance, simple to manage and easy for faculty and students to use without hours of training. Ideally, it will allow you to create virtual environments from multiple locations within a campus or across multiple campuses. It's also essential that your solution is compatible with your campus network and fits within your designated AV spend.

Examples:

- Lecture capture
- Online learning
- School event streaming
- Hybrid classrooms
- On-campus video recording studios
- Live speech-to-text transcription.



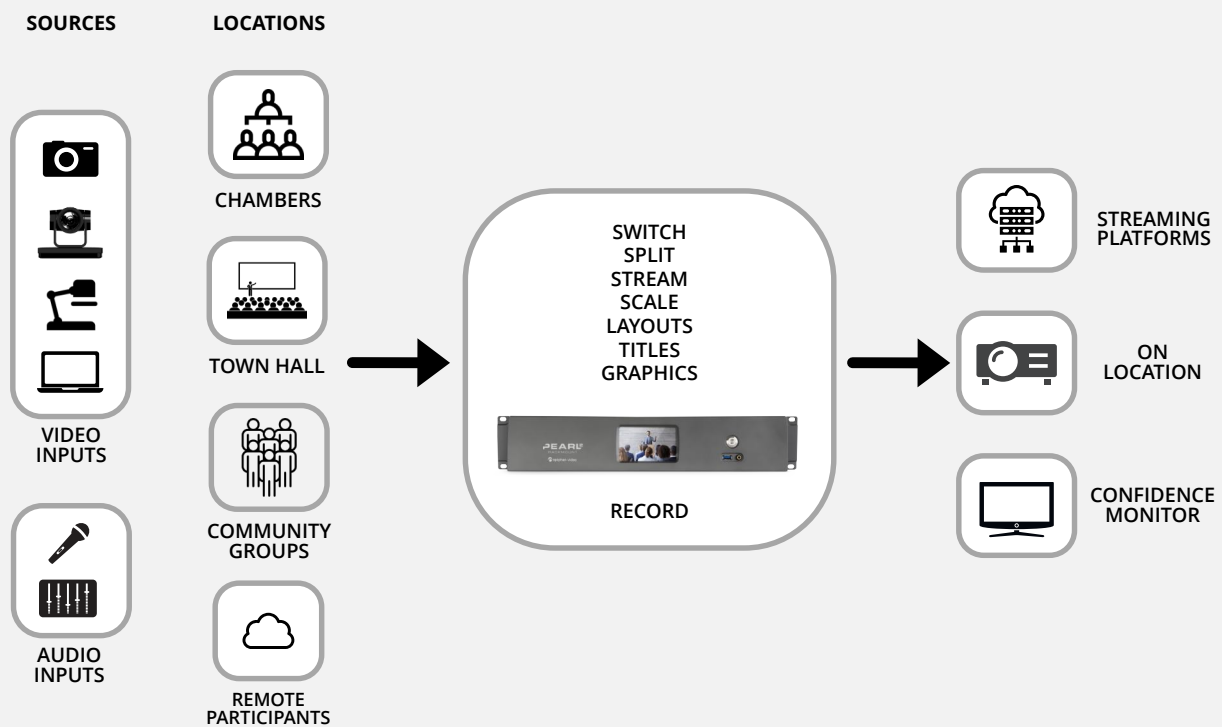
Local Governments

Local governments are increasing community engagement and transparency by live streaming their council meetings. Furthermore, many councils operate community venues that will benefit from access to robust live event streaming technology.

Due to the wide variety of functions that live streaming supports in local government, your live streaming solution must be robust, dynamic and easy to implement. Ultimately, it must be easy to use and pre-configured for various applications.

Examples:

- Public Council meetings
- Public addresses and speeches
- Public hearings and press briefings

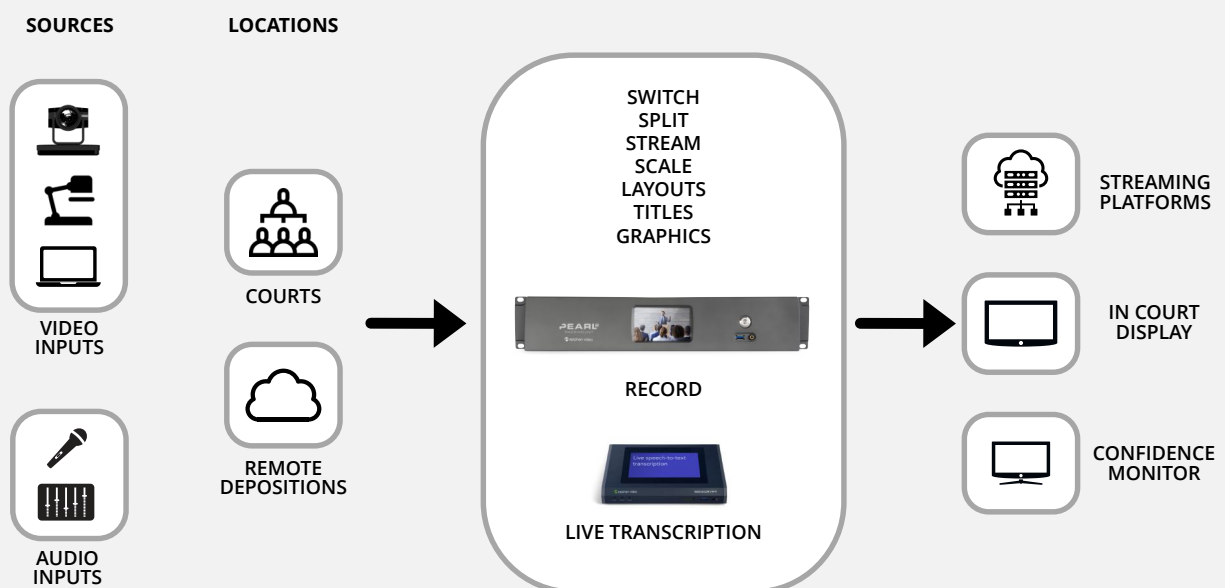


Legal courtrooms and public hearings

Video capture, live streaming and recording have become critical components of courtroom proceedings. The need ranges from robust remote courtroom participation to facilitating broader community transparency where appropriate. The solution must be easy to deploy and manage using standard operating procedures and be scalable and adaptable to changing needs.

Examples:

- Evidence presentation
- Video record keeping
- Overflow and press rooms
- External live streaming
- Video conferencing support
- Remote depositions

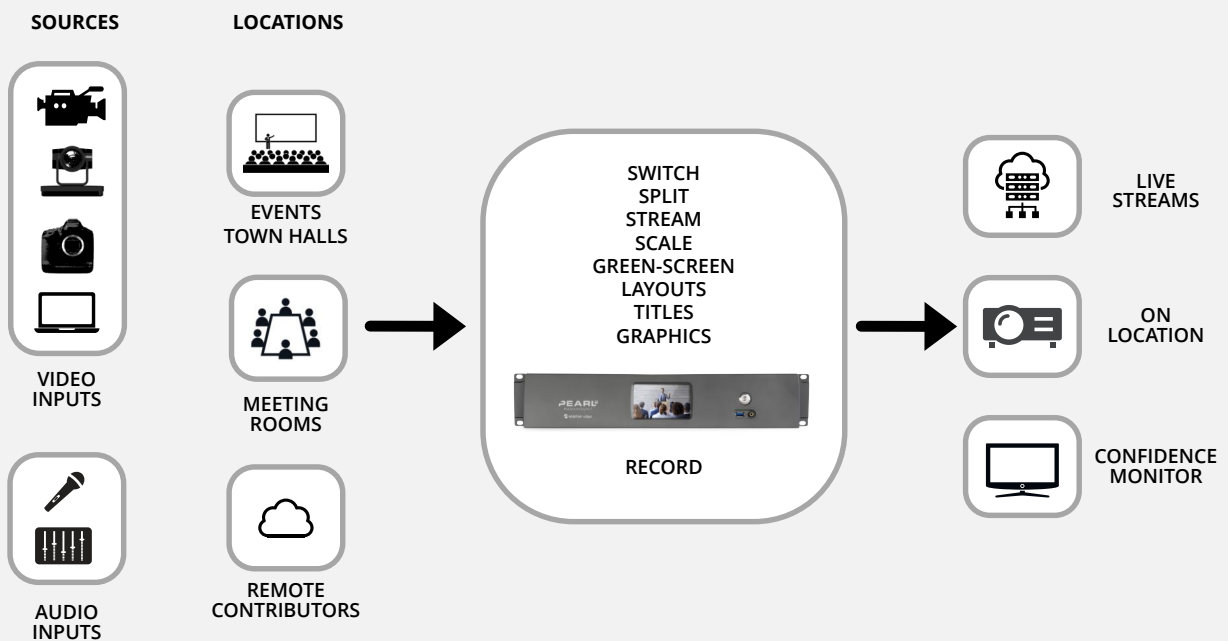


Corporate

Whether your business is an SME or enterprise, you need a feature-packed and robust live video solution that can support your evolving AV needs. Compatibility is also vital, as you want to implement a solution that will integrate seamlessly with your existing IT infrastructure.

Examples:

- Onboarding and training
- Company town hall meetings
- Virtual conferences
- Webinars
- Executive messages
- UX and usability testing

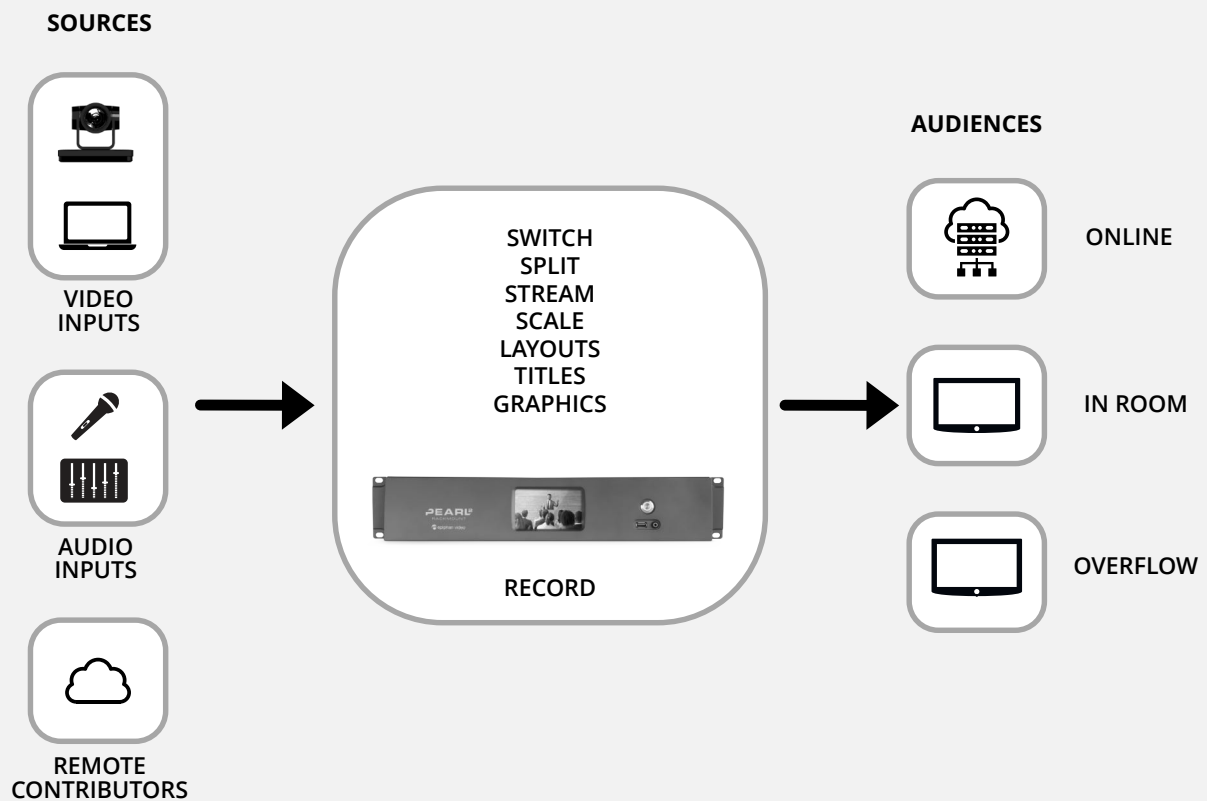


Churches and ceremonies

Simplicity is essential when live streaming for churches, synagogues, mosques and funeral venues. Your live streaming solution should be easy to use with minimal training and deliver a feeling of connectedness to remote attendees.

Examples:

- Weekly services
- Special events
- Weddings
- Funerals
- Overflow rooms



Introducing Epiphan Video

Epiphan Video provides a range of award-winning, purpose-built hardware solutions that help your business create impactful video content simply.



Live video production

High-performance hardware for video capture, streaming, and recording.



SWITCHING



STREAMING



RECORDING



Epiphan Pearl Nano™

Use as a powerful and reliable single-channel video distribution device, contribution encoder, or streamer and recorder add-on to a full production switcher.

Optional 4K add-on



4096 × 2160 - 30fps



Epiphan Pearl Mini™

Simplify your lecture capture or live event production. Record, stream, and switch multiple HD inputs simultaneously.



1920 × 1200 - 60fps



Epiphan Pearl Nexus

Designed with flexibility in mind, Nexus fits at the center of video workflows, seamlessly integrating with all the hardware and software used in professional AV environments.



Epiphan Pearl-2™

Powerful, all-in-one live production system with 4K HDMI, 12G SDI, NDI, and the capacity for six simultaneous 1080p channels.

Optional 4K add-on.



4096 × 2160 - 30fps



Epiphan Pearl-2™ Rackmount

All the same features as Pearl-2 but designed for installation in a rack.

USB capture cards

Capture any video source to USB.



Epiphan AV.io 4K™

Capture 4K over HDMI in perfect fidelity or use hardware scaling to capture any resolution needed for your application.



4096 × 2160 - 30 fps
1920 × 1080 - 60fps



Epiphan AV.io HD+™

The simplest way to capture HDMI, VGA, or DVI video sources at resolutions up to 1080p. Audio input.



1920 × 1080 - 60fps



Epiphan AV.io SDI+™

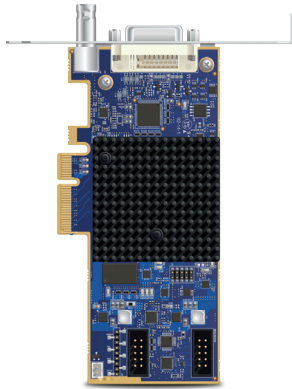
Works seamlessly with your SDI video sources, including: SD-SDI, HD-SDI, and 3G-SDI. Audio input.



1920 × 1080 - 60fps

Internal capture cards

High performance and easy installation.

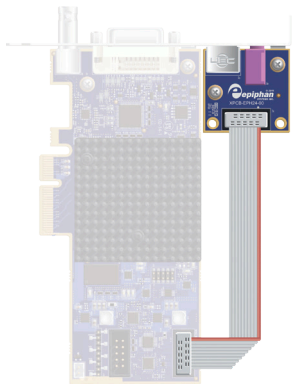


Epiphan DVI2PCIe Duo™

Internal PCIe capture card captures lossless video from dual-link and single-link DVI video sources, as well as VGA, HDMI, and SDI video sources with audio from SDI and HDMI sources.



2560 × 1600 - 85 fps
2048 × 2048 - 85 fps

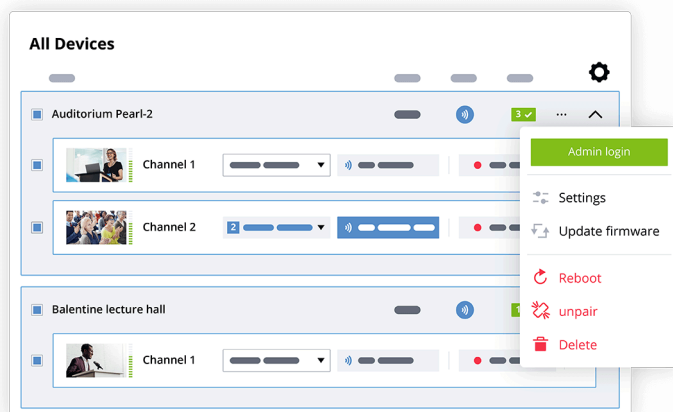


Epiphan DVI2PCIe AV Kit™

Extend the functionality of your DVI2PCIe Duo capture card and add even more video and audio inputs.

Epiphan Edge

Centralised remote management and control for Epiphan hardware.



Power up your Pearl devices with enhanced features, cloud-control, and centralised fleet management to make your Pearl systems even more user friendly.

Centralised configuration and monitoring make it a cinch to manage fleets of any size.

Automate your video spaces with scheduling, collaborate in the cloud and monitor devices 24/7.



Distributed in Australia and
New Zealand by A.P.
Technologies Pty Ltd

aptech.com.au

APTECH

™ and © 2024 Epiphan Systems Inc. All rights reserved.

Epiphan, Epiphan Video, Epiphan Systems, its products names and logos are tradenames or trademarks of Epiphan Systems Inc. All other company, interface and product names and logos are trademarks or registered trademarks of their respective owners in certain countries. Product descriptions and specifications regarding the products in this document are subject to change without notice.