ST2110 Solution:
Extend the Vision further

As a global leading LED display solution provider, we are thrilled to introduce you to the next-generation AV over IP solution, SMPTE ST 2110.

Simplify LED structure and Standardize media input transmission.

Traditional Audio-Video Transmission Solutions

In fixed installation display projects, AV transmission solutions have always been an area of concern. Traditionally, AV transmission solutions are divided into centralized AV type transmission and distributed A/V over IP (AVoIP) type transmission based on the type of transmission signal and the topology.

For centralized AV type transmission, media signals need to be first routed through AV interfaces into a centralized video switcher, which then processes the signals and distributes them separately to back-end devices. However, due to the use of traditional AV protocol interfaces like SDI, this solution has limited extensibility, and long-distance transmission requires additional optical-electrical converters.

In contrast, distributed AVoIP transmission allows both audio and video signals to be unified through codec devices into an IP switch, increasing system flexibility. However, traditional protocols of codec devices can lead to compression and loss of media details.

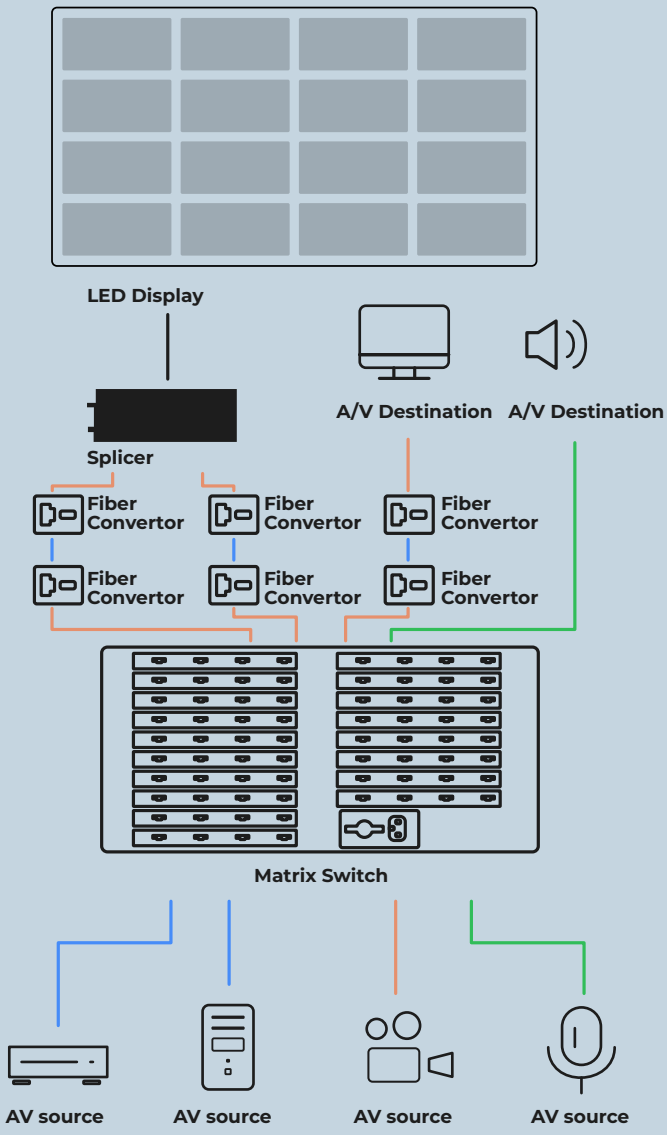
Overall, the traditional AV transmission solutions in the current fixed installation industry exhibits the following deficiencies:

1). Limited transmission distance and a lack of flexibility, compatibility, as well as extensibility due to traditional AV interfaces.

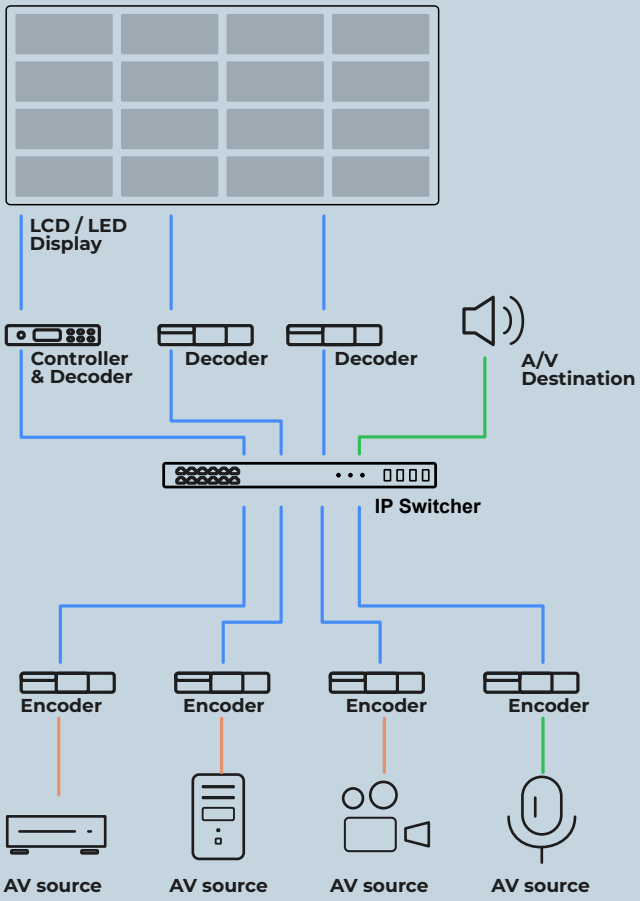
2). High latency and loss of media quality due to traditional protocols.

3). Complexity in system structure and high overall costs due to the diverse array of devices and interfaces employed.

Graph 1:
Traditional AV Topology



Graph 2:
Traditional A/V over IP Topology



SMPTE ST 2110

As mentioned above, traditional AV transmission solutions can no longer fully meet the needs of various industries due to the development of digital technology. The limitations of conventional video interfaces and traditional signal IP conversion for transmission are becoming more apparent. To tackle these issues, the Society of Motion Picture and Television Engineers (SMPTE) has developed the ST 2110 standard, aiming to serve as the technical foundation for future media integration goals and more.

2.1 SMPTE ST 2110 Standard Overview

SMPTE ST 2110 is a set of professional AV transmission standards based on IP networks, with significantly higher bandwidth compared to traditional protocols, reaching up to 25G, 40G, and 100G. Leveraging the bandwidth superiority of SMPTE ST 2110, its transmission streams encompass a multitude of components, such as video, audio, and system timing.

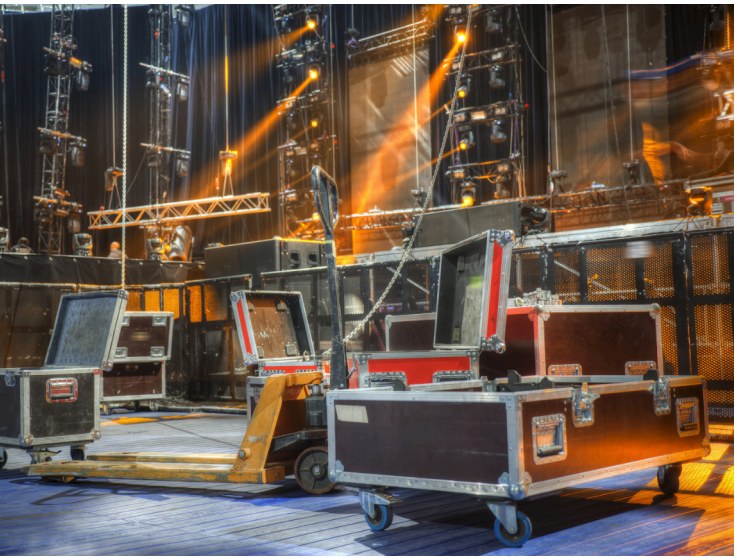
1). SMPTE ST 2110-10: System Timing defines clock synchronization based on PTP to ensure timestamp synchronization for audio and video streams.

2). SMPTE ST 2110-20: Uncompressed Video specifies the transmission of video streams in IP networks, including video frame formats, compression methods, and other related parameters.

SMPTE
ST 2110

3). SMPTE ST 2110-30: Uncompressed Audio defines the transmission of audio streams in IP networks, including channel configuration, sampling rates, bit depth, etc.

4). SMPTE ST 2110-40: Ancillary Data defines methods for carrying auxiliary data, including commercial value-added services related to video such as ad queues, closed captions, timecode, etc.



2.2 Advantages of SMPTE ST 2110

1). **High-quality Transmission**: The high bandwidth of the SMPTE ST 2110 standard enables low-latency transmission even for ultra-high-definition media (4K/8K).

2). **Flexibility**: The use of separate data packets (such as video, audio, ancillary data, etc.) as the basic transmission form enhances transmission and reception efficiency and flexibility.

3). **Compatibility**: Support for NMOS protocol facilitates interoperability, and enables devices compliant with SMPTE ST 2110 to establish multicast connections with any third-party IP devices, thus improving system compatibility.

4). **Structure Simplification and Stabilization**: Compared to distributed codec-based IP conversion and centralized AV interface transmission requiring optical-electrical converters, SMPTE ST 2110 needs no longer additional equipment for signal IP conversion, simplifying system structure, reducing equipment costs and improving stabilization.

2.3 Applications and Development

Application

Since the SMPTE ST 2110 standard was introduced, it has been widely used in various fields such as broadcasting, sports events, remote collaboration, and government projects.

The uncompressed AV transmission achievable with SMPTE ST 2110 meets the basic requirements of the broadcasting industry for high-definition, high-frame-rate, and high-quality media. Its characteristic of separated transmission and high-precision clock synchronization also meet the demands of live digital streaming in fields like sports events for

multi-signal processing and mixing. Moreover, the fiber network transmission method of SMPTE ST 2110 provides excellent remote transmission and reliable information security, reducing geographical constraints for transmission solutions and offering irreplaceable benefits for remote collaboration and government projects requiring high confidentiality.

Development

Given its broad spectrum of applications, numerous market factors are driving further development and popularization of the SMPTE ST 2110 standard.

1). With the rapid growth of digital media and the evolution of conventional broadcasting, there's a growing need for high-quality, flexible, and extensible AV solutions. The proliferation of high-definition and HDR technologies drives the industry towards more advanced AV transmission standards. SMPTE ST 2110 stands out for its versatility and multi-format support, making it the prime candidate for the future broadcasting industry.

2). Improvements in IP network infrastructure (including higher bandwidth, lower latency, and more stable network connections) make remote production collaboration more feasible with SMPTE ST 2110. It also provides more options for the AV industry to gradually evolving to IP-based workflows, ensuring broadcasting companies to achieve more efficient, flexible and extensible production.

3). The SMPTE ST 2110 standard, formulated and promoted by SMPTE, has gained broad industry recognition. Concurrently, vendors specializing in software and hardware solutions related to SMPTE ST 2110 continue to invest and innovate, ensuring a steady stream of superior and reliable products to the market, which will promote the widespread adoption of ST 2110 in various fields in the future.

NovaStar Video-Over-IP Solution | 2024

NovaStar's SMPTE ST 2110 Solution

3.1 SMPTE ST 2110 Solution

NovaStar is committed to providing users with superior full-link LED display products. Up to now, it has launched its flagship high-end product, MX6000 Pro. MX6000 Pro features a popular modular design, housed within a compact 6U chassis capable of accommodating 141 million pixels. This is equivalent to 16 times the resolution of 4K, delivering exceptional performance and versatility. Most importantly, based on the advantages and advancement potential of the SMPTE ST 2110 standard, NovaStar has unveiled a new solution supporting the SMPTE ST 2110 standard for MX6000 Pro, ensuring the product's versatility across diverse application scenarios and technical domains.

Unique Advantages

In addition to simplifying system structure, preserving higher media quality, and achieving more flexible long-distance transmission schemes through the application of the ST 2110 standard, NovaStar's SMPTE ST 2110 solution for MX6000 Pro also offers unmatched benefits, including:

1). Enhanced Capacity for Single-device Usage: With the SMPTE ST 2110 solution integrated into MX6000 Pro, it can now achieve 4K input (4K@60Hz, 10bit, 4:4:4) through just a single input card. Moreover, the device supports 8 routes

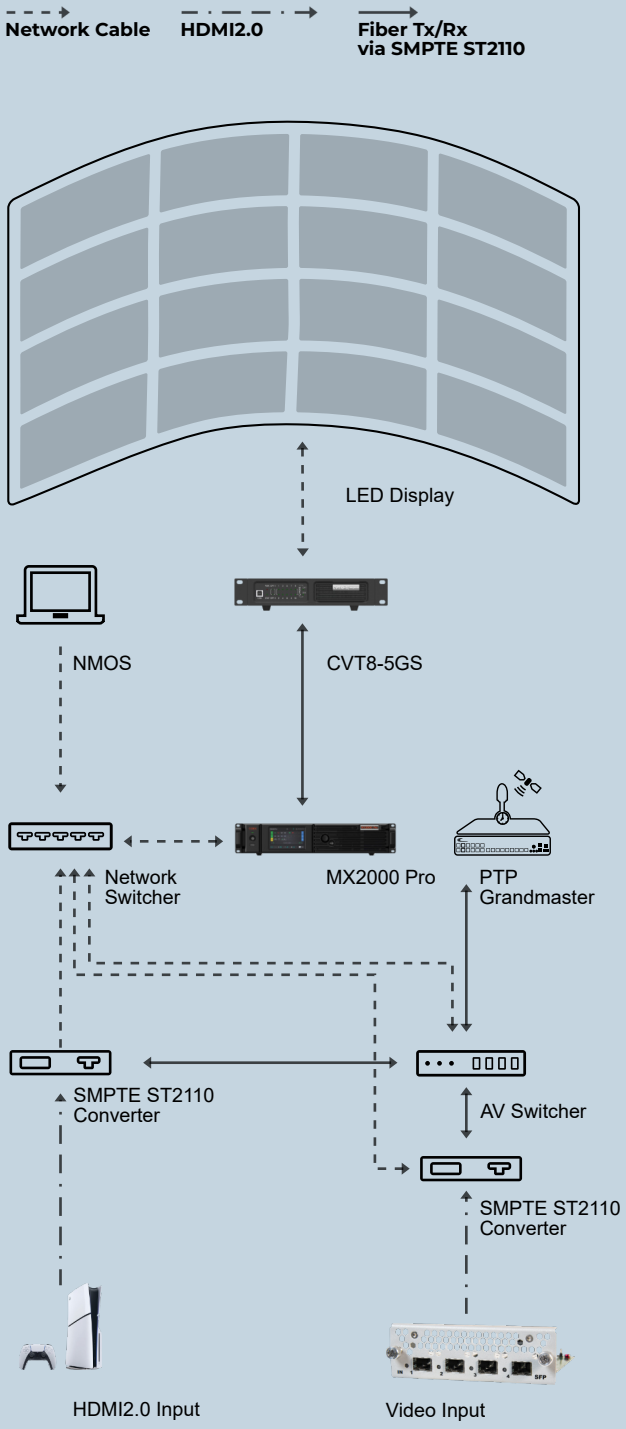
of SMPTE ST 2110 25Gbps SFP28 interfaces, as well as high resolution, high frame rate, high color depth, providing an excellent visual experience.

2). Seamless Switching Between Primary and Backup Sources: It supports input source backup and seamless switching between primary and backup video sources. In the event of a primary source failure, the LED display can still operate normally, ensuring no flicker, corrupt or black out.

3). Simpler and More Flexible Assembly and Management: It supports optical network transmission for video sources, ensuring their security while providing more user-friendly assembly and management process. Moreover, the properties of ST2110 input card can be controlled and managed through third-party NMOS software and NovaStar's VMP control software, giving users the flexibility to choose configuration methods that suit their needs for smoother operation.

4). Ultra-low Latency: Precise Time Protocol (PTP) ensures nanosecond-level accuracy synchronization, achieving ultra-low latency display and picture synchronization.

5). Lower Costs: Employing extensible IP network technology instead of traditional SDI transmission reduces the cost of cables and video switchers.



Graph 3:
SMPTE ST 2110 Topology

3.2 Multi-perspective Solution Optimization

Alongside introducing a brand-new ST 2110 solution, NovaStar also offers various LED display optimization services from different perspectives, which includes:

1). 22bit+/ Precise Grayscale
Improving grayscale performance by 64 times, solving issues like low grayscale bounce and improving low grayscale display effect.

2). Color Management
Precisely controlling gamut, and flexibl y switching among BT.709, DCI-P3, BT.2020, etc.

3). Multi-layer Full Grayscale Calibration
Effectively improving the brightness & chroma uniformity medium under low grayscale.

4). Thermal Compensation
Effectively solving color shift issues cau sed by uneven heat dissipation.

5). Dynamic Booster
By optimizing the details of both bright and dark content to an ideal level, SDR sources can achieve an HDR-like effect.

6). High Bit Depth and High Frame Rate
Supporting 10 Bit/12 Bit and high frame rate up to 240 Hz.

Last but not least, to address the long-standing challenges in LED control system software, such as high entry barriers, low communication efficiency, difficult operation permission differentiation, and high troubleshooting and maintenance costs, NovaStar has launched VMP control software, which boasts its enhanced user interaction, streamlined operation, and comprehensive system monitoring. By integrating software and hardware, NovaStar aims to provide users with efficient and complete LED display solutions.

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