

Postprint: Design Analysis of Technical Renovation for High-Definition Studio Video Systems

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Date: 2023-10-08T00:00:00+00:00

Abstract

With the rapid advancement of science, technology, and information technology, China's media industry is currently undergoing swift development, while the television industry has imposed stringent requirements on studio program production in China. Consequently, high-definition studio production video signals have gradually emerged into public view, with high-definition studios becoming an essential system in television program production. High-definition studio video systems significantly influence both the effectiveness of program production and the influence and impact following broadcast. The existing VIZRT online packaging system has been further expanded, placing higher demands on high-definition studio video systems and further driving their upgrade and transformation. Therefore, China's media industry is increasingly emphasizing the analysis and application of high-definition studio video systems. This article analyzes the design principles for upgrading and transforming contemporary high-definition studio video systems in China, drawing upon practical experience.

Full Text

Analysis of Technical Renovation Design for High-Definition Studio Video Systems

Abstract: With the rapid development of science and information technology, China's media industry has experienced swift growth, leading to stringent requirements for studio program production in the television sector. Consequently, high-definition studio video signals have gradually emerged as an essential component of television program production. High-definition studio video systems significantly influence both program production quality and the impact and appeal of broadcast content. The existing VIZRT online packaging system has been further expanded, imposing higher demands on high-definition studio video systems and driving their renovation and upgrading. Therefore,

China's media industry is increasingly focusing on the analysis and application of high-definition studio video systems. This article examines the renovation design principles of current high-definition studio video systems in China based on practical experience.

Keywords: high-definition studio video system; technology; renovation; analysis

CLC number: TN948.12

Document code: A

Article ID: 1671-0134(2018)02-061-02

DOI: 10.19483/j.cnki.11-4653/n.2018.02.021

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High-definition studio video systems have adopted a networked VIZRT online packaging system. During the 12th Five-Year Plan period, the State Administration of Press, Publication, Radio, Film and Television proposed enhancing the production and dissemination capabilities of high-definition and stereoscopic television, imposing higher requirements on program effects and production quality for provincial television stations and accelerating the development of HD television shooting and production capabilities. In particular, stricter demands on studio program production effects have posed severe challenges to China's traditional television industry while also ushering in a new development boom.

To meet the development requirements of China's television industry and actively implement relevant national policies, it is necessary to conduct in-depth analysis of the renovation and construction of high-definition studio video systems. This analysis represents an inevitable trend for the future development of China's television industry. High-definition studio video systems incorporate high-definition digital synchronizers that generate synchronization signals to ensure video image clarity and stability [2].

2. Design Principles for High-Definition Studio Video System Renovation

Renovation and upgrading of high-definition studio video systems must strictly comply with relevant regulations and principles to ensure smooth implementation of design work.

First, the safety and reliability of the original high-definition studio video system must be maintained without compromising its existing functions and advantages, with emphasis on emergency response measures. The primary responsibility of news studio systems is to ensure safe live broadcasting. Therefore, the original system's emergency measures and backup functions should be retained, with renovations focusing only on specific components to overcome traditional system limitations while improving functionality without affecting the foundation of safe live broadcasting [3].

Second, the renovation design should balance system stability and compatibil-

ity by employing mature technology and treating all system components as an integrated whole. This holistic approach must consider various television recording requirements and actual live broadcasting needs, conduct in-depth analysis of problems in previous television program production, and adopt appropriate design methods to innovate program production and live presentation techniques. The overall framework should accommodate additional equipment connections, improving channel utilization without disrupting original system wiring [4]. The renovation should simplify the traditionally complex and cumbersome operations, enhance equipment operation efficiency, and make processes more straightforward and intuitive. Equipment selection must strictly follow design technical specifications to maintain operational stability and safety, satisfy diverse user needs, improve functional systems, and increase operational efficiency while ensuring convenient and flexible maintenance and signal allocation. Expanding application scope represents a key focus of high-definition studio video system renovation.

Finally, the scalability of high-definition studio video systems must be continuously improved. During renovation design, functional extensibility should be emphasized, with reserved space for future development needs. Equipment chassis scale, transmission lines, and other components should be purchased according to actual site conditions and system requirements to avoid waste and reduce costs [5].

1. Overview of High-Definition Studio Systems

In television program production, high-definition studios have become essential systems that significantly influence program production quality and broadcast impact. Initially, high-definition studio systems were not widely adopted by the television industry, being used primarily in several news live programs, yet this demonstrated their gradual acceptance. Both theoretical research and practical application of high-definition studio video systems were initially immature and underdeveloped. With continuous advancement in science and information technology, virtual studio technology has achieved breakthrough development. Powerful online packaging systems offer significant advantages, including low cost, high efficiency, convenience, and flexibility, providing highly appealing and aesthetically pleasing packaging effects for various television programs. However, these advances also impose higher demands on high-definition studio program production levels and new technology applications [1]. To fully leverage the advantages and performance of virtual studio technology, it is essential to continuously improve high-definition studio program production capabilities and the application of other new technologies. Therefore, renovating and upgrading traditional high-definition studio video systems is necessary to meet the smooth implementation of online packaging work for various programs, enable flexible adjustment of required rendering signals, and deliver high-quality program effects to audiences.

3.1 Adding Rendering Engines

The high-definition studio video system originally had five rendering engines, each with different functions. The first and second engines rendered online packaging elements, including program titles, names, and subtitles, to enhance appeal and enable viewers to watch programs more directly and vividly. The fifth engine primarily rendered left-flying subtitles, while the fourth and third engines rendered virtual-actual combination elements in the studio, creating a virtual-actual integrated space for program production based on camera advantages and in strict accordance with relevant regulations and requirements. Adding rendering engines enhances program production capabilities and presents audiences with more vivid and engaging television effects [6].

3.2 Adding High-Definition Matrix

After adding rendering engines to the high-definition studio video system, it is necessary to add a high-definition matrix. Using a matrix-switcher combination approach, input rendering signals can be appropriately adjusted to make signal display more intuitive and visual, simplify operational processes, and facilitate more convenient signal calling. This approach overcomes the limitations of traditional high-definition studio video systems, including few signal sources, unsmooth output, and channel occupation issues. Incorporating a rendering signal scheduling matrix into high-definition studio video systems represents an inevitable trend in television industry development, as it can simultaneously input numerous signals, improve work efficiency, significantly enhance signal input quality, and ensure system reliability and safety. When adding the rendering signal scheduling matrix, care must be taken not to affect the original studio system's live broadcast equipment, as live settings directly relate to television program recording and broadcast effects. After signal sources enter the high-definition studio video system, they pass through a video distributor before connecting to the switcher, television wall, and rendering signal scheduling matrix, with the entire operational process strictly following relevant regulations and requirements [7].

3.3 Renovation of Main/Backup Broadcast Hard Drives

In the initial design of television high-definition studios, to ensure seamless program connection and meet industry development needs, four hard drive systems were integrated into the high-definition studio video system. This arrangement not only ensured seamless connection of various news programs, reasonable scheduling, reduced production costs, and optimal program effects but also guaranteed the safety of various news live broadcasts. At the current stage, facing renovation and upgrading of high-definition studio video systems, it is necessary to reduce this to one main and one backup hard drive system, thereby reducing channel occupation. After hard drives connect to the synchronizer, signals can operate normally. Naturally, it is essential to retain the original wiring mode

to improve flexible application capabilities and ensure live broadcast safety.

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Source: ChinaXiv — Machine translation. Verify with original.