

On Digital Audio Technology and Its Application in Radio and Television Engineering Postprint

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Abstract

Digital audio technology, on the basis of continuous improvement and innovation, has achieved extensive application in the fields of network streaming media and digital television, yielding notably significant results. At the present stage, the scope of application of digital audio technology in modern radio and television engineering construction is becoming increasingly broad, and it has virtually become the principal technology for radio and television engineering construction. Therefore, it is necessary for us to conduct further investigation into the application of digital audio technology, in order to better advance the development of China's radio and television industry. To this end, the author primarily investigates its specific applications in modern radio and television engineering construction by integrating the meaning, application principles, and related content of digital audio, for reference.

Full Text

A Brief Discussion on Digital Audio Technology and Its Application in Radio and Television Engineering

Abstract: Digital audio technology has achieved remarkable application results through continuous improvement and innovation, gaining widespread adoption in network streaming media and digital television. At present, digital audio technology is being applied across an increasingly broad scope in modern radio and television engineering construction, effectively becoming the dominant technology in this field. Therefore, further investigation into the application of digital audio technology is necessary to better promote the development of China's radio and television industry. This paper examines the specific applications of digital audio technology in modern radio and television engineering construction by exploring its meaning, application principles, and related content, providing a reference for practitioners in the field.

Keywords: digital audio technology; radio and television engineering; specific applications

Since its invention, audio technology has undergone multiple refinements and upgrades, yielding positive results. Digital technology, in particular, has attracted significant attention in recent years due to its outstanding performance in transmission rate and accuracy. Researchers have proposed integrating audio technology with digital technology, a concept that has been implemented in practice and has evolved into the digital audio technology now widely used in the broadcasting and television industry.

1.1 The Meaning of Digital Audio Technology

Digital audio technology is fundamentally a new type of technology within the domain of digital audio signals, with digital broadcasting and television technology serving as its core technology and basic standard. Through years of research and practice, digital audio technology has eliminated the drawbacks of traditional analog signal technology by fully integrating with digital processing technology, achieving high transmission efficiency and quality objectives. It has now been popularized across various fields of radio and television engineering, yielding significant application results [1]. With the arrival of the big data era, new technologies such as information technology and multimedia technology have found extensive application across various domains, demonstrating substantial value. Among these, digital audio technology stands out as particularly valuable.

1.2 The Application Principle of Digital Audio Technology

The term “digitization” refers to the process of converting a continuous analog signal medium into discrete pulse data within a certain time frame. Continuous analog signals typically exhibit characteristics of time variation and amplitude variation, forming constantly changing mechanical waves under these two features. To ensure effective transmission of continuous analog signals, PCM technology is generally employed for enhanced control [2]. Additionally, digital audio broadcasting systems typically operate in a “one-to-many” mode, and the digital audio technologies applied are not limited to a single form but may also include networking technology, wireless transmission technology, and others, with the primary goal of ensuring optimal viewer and listener experiences.

1.3 The Main Content of Digital Audio Technology

Digital audio technology involves numerous and complex work components, which can be categorized into main areas such as signal acquisition, source coding, and compression coding. Under special requirements, digital audio technology may also be applied to storage and broadcasting aspects. In the overall operation of current radio and television engineering, these digital audio

technologies and work components are closely related and coordinated, requiring operators to possess certain professional skills to ensure optimal application results [3].

2. The Application Value and Specific Advantages of Digital Audio Technology in Radio and Television Engineering Construction

Based on past experience, the application of digital audio equipment can essentially meet the relevant requirements of the big data era for the radio and television industry while effectively retaining the application advantages of original analog signals to ensure compatibility. This compatibility means that digital audio equipment can operate in both analog signal environments and digital signal environments. Furthermore, audio quality processed by digital audio technology can maximally preserve the original sound quality, ensuring an optimal listening experience for audiences.

First, the combination of recording and multi-track digital hard disks.

According to current standards, digital audio can be divided into multiple formats with sixty-four tracks. Under the combined action of various multi-track digital hard disks with different functions and characteristics, it is basically possible to provide sound quality assurance for music and language recordings. Most importantly, the combination of digital audio technology with multi-track digital hard disks can further optimize the track merging level during recording, enhance overdubbing effects, and achieve the purpose of expanding tracks [4].

Second, the digital editing function of digital audio technology can maximize audio quality improvement.

Based on past application experience, operators can complete sound processing work through high-resolution computer screens, with sound displayed in waveform format to eliminate adverse effects such as noise. Additionally, digital editing functions can assist in post-production editing and production, optimizing editing effectiveness by improving editing accuracy and coherence. This can effectively avoid deficiencies in previous technologies and ensure final transmission quality.

Third, the data processing capability of digital signals is unmatched by traditional analog signals.

Previously, radio and television engineering primarily used analog signal technology for signal processing. Due to technological limitations at the time, analog signal processing technology had many drawbacks in practical application. For instance, transmission signals were susceptible to interference from weather and other factors, resulting in varying degrees of data inaccuracy and causing broadcast programs to suffer from “snow” and other issues, with picture quality unable to be guaranteed. The emergence and widespread adoption of digital audio technology have largely eliminated these issues, not only improving data processing accuracy but also enhancing signal transmission quality, demonstrating significant application value [5].

Fourth, digital signals offer greater storage space and capacity. Digital audio technology incorporates the massive data storage function of computers, enabling effective storage of relevant equipment information and audio programs, thereby solving the problem of limited storage space in traditional analog signals. To a certain extent, the storage space based on digital audio technology not only offers the advantage of larger capacity but also provides stronger storage capabilities, enabling secure management of information and effectively preventing virus intrusion and other issues.

3.1 The Specific Application of Digital Mixing Consoles in Radio and Television Engineering Construction

The specific application of digital mixing consoles in radio and television engineering construction is primarily manifested in sound quality broadcasting effects. Based on past experience, digital mixing consoles under digital audio processing technology have achieved excellent results in reducing noise and crosstalk. They not only combine the advantages of traditional mixing consoles and digital mixing consoles but also integrate the advantages of analog signal processing technology and digital audio technology, while possessing the characteristics of digital switching matrices to further improve sound quality. In addition to these application advantages, digital mixing consoles can also combine multiple control surfaces to complete the switching of operating environments, allowing users to experience multiple operating environments and maximizing user satisfaction with visual and auditory requirements. Most importantly, digital mixing consoles are smaller in appearance than traditional mixing consoles yet have more channels, basically meeting the connection requirements of multiple points [6].

3.2 The Specific Application of Digital Audio Embedding Technology in Radio and Television Engineering Construction

At present, operators often choose to apply digital audio embedding technology to complete specific tasks during program processing or production. Digital audio embedding technology primarily refers to the integration of digital audio technology with digital component serial technology and connection with digital component serial interfaces to meet the production requirements of high-definition digital programs and maximize processing effectiveness. Generally, during the conversion of analog signals to digital signals, certain issues may arise that affect final broadcast quality. Since digital information is prone to serial interference after being picked up, we must seek reasonable methods to avoid such situations and optimize final program broadcast quality. To address this, operators can choose to apply digital audio technology comprehensively to certain common parts. For example, embedding SDI signals into digital audio signals achieves the purpose of real-time and simultaneous transmission of video and audio. Overall, applying digital audio embedding technology to radio and television engineering construction can ensure actual transmission quality and

improve actual transmission efficiency, offering significant application value.

Conclusion

In summary, with the continuous deepening of China's big data era, new technologies such as digital audio technology will be applied more extensively in the field of radio and television engineering. They will not only bring audio-visual enjoyment to audiences but also create new development space for the radio and television field, demonstrating substantial application value. It is believed that in the near future, digital audio technology will be further strengthened and optimized to better serve radio and television engineering construction, achieve expected application goals, and further promote the prosperity and development of China's radio and television industry.

References: [1] Zhao Changyong. Research on the Application of Digital Audio Technology in Modern Radio and Television Engineering Construction [J]. Science and Technology Communication, 2017, 9(24): 91-92. [2] Xie Xianglong. Digital Audio Technology and Its Application Practice in Radio and Television Engineering Construction [J]. West China Broadcasting TV, 2017(08): 198. [3] Xi Qiongying. The Application of Digital Audio Technology in Radio and Television Engineering Construction [J]. West China Broadcasting TV, 2017(02): 197. [4] Wang Zhenzhe. The Application of Digital Audio Technology in Radio and Television Engineering [J]. West China Broadcasting TV, 2016(20): 223-224. [5] Wang Wenli. Research on the Application of Digital Audio Technology in Modern Radio and Television Engineering Construction [J]. Computer CD Software and Applications, 2013, 16(22): 192-193. [6] Fang Yuan. Research on the Application of Digital Audio Technology in Modern Radio and Television Engineering Construction [D]. Northwest Minzu University, 2014.

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Note: Figure translations are in progress. See original paper for figures.

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