

Postprint: Main Microphone Placement Methodology in Television Recording

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Abstract

In television recording, there exist numerous variations that are primarily related to the placement of the main microphone. Selecting an appropriate microphone based on the position of the sound source is of paramount importance. Even microphones that appear identical can produce different effects. Although placement positions may vary, they are essentially selected in the vicinity of the central axis of the stage. Furthermore, the choice of microphone directivity and type is also determined according to specific circumstances. Correct positioning of the main microphone creates distinct environmental effects and spatial impressions for the audience. This paper investigates the placement methods of main microphones in television recording to produce sound effects with varying characteristics.

Full Text

Research on Main Microphone Placement Methods in TV Recording

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Abstract

TV recording exhibits numerous differences, primarily related to main microphone placement. Selecting an appropriate microphone based on sound source position is crucial. Even seemingly identical microphones produce different effects. Although placement positions vary, they are basically selected near the central axis of the stage. Additionally, microphone directivity and type selection depend on specific circumstances. Correct placement of the main microphone creates different environmental effects and spatial impressions for the audience.

This paper studies main microphone placement methods in TV recording to create sound effects with different characteristics.

Keywords: TV recording; main microphone; placement methods

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Introduction

In television programs, specialized microphones are required for sound transmission to present TV recordings more perfectly to listeners' ears. To make various sounds in TV recording clear and spatially effective, numerous attempts have been made to continuously adjust microphone placement, seeking an optimal approach to make TV recording work more efficient and create an immersive atmosphere for the audience.

1. Challenges in TV Recording

1.1 Inherent Balance Differences For Western music, from the perspective of inherent musical balance, any performance exhibits excellent balance, and the recording process simply requires reproducing the original sound field. TV recording, however, is different. In TV recording, actors are positioned at center stage while accompaniment is typically located at the rear, making balance difficult to maintain. Additionally, human voice harmonics are primarily high-frequency, and many instruments are also high-frequency, resulting in poor frequency response balance. Without sound reinforcement in TV recording, actors' voices can easily be masked by instruments, making the balance incomparable to Western music recording. To reduce negative impacts and accurately reproduce the recorded sound, main microphone placement must be continuously adjusted through repeated experiments with suspension positions.

1.3 Different Impact of Sound Reinforcement In Western concerts, loud sound reinforcement is generally not employed. If used, it only supplements certain instruments. Consequently, the impact of sound reinforcement on concerts is negligible, as audiences primarily hear direct sound from instruments. In TV recording, however, high-decibel reinforced sound is frequently present. While this amplification satisfies audience hearing, it creates numerous recording challenges. Since much of the audience area pickup is dominated by high-volume reinforcement, which also affects TV recording, main microphones are typically placed exclusively in the audience area.

1.4 Varying Recording Hall Conditions The design of Western artistic performance halls is highly sophisticated, with excellent reverberation time density and abundant reflected sound. This hall design produces better sound dispersion effects, creating a heavy, warm auditory impression. However, in

Chinese TV recording, hall designs tend to have a thinner quality. For instance, in the filming of mythological TV dramas or martial arts series, where sound requirements differ, the recording hall setup is quite particular. The ceiling lacks reflection panels but features sound reinforcement capabilities. These differences affect main microphone placement. When recording classical music, two microphones are typically selected, with directional microphones placed beyond the reverberation radius. This approach yields excellent scene perception, giving audiences an immersive feeling. However, placing microphones this way in TV recording would not produce such effects.

2. Necessity of Main Microphone in TV Recording

Recording methods and approaches are largely determined by sound balance. Since Western music possesses good balance, its pickup methods can serve as primary references. The main microphone enhances environmental ambience and reproduces realistic scenes. However, TV recording lacks such balance, resulting in different approaches. TV recording employs “zonal pickup,” dividing the space into stage, accompaniment, and audience zones. By controlling pickup in these three zones, mutual interference is reduced. This zonal method produces sound more aligned with aesthetic preferences. Additionally, from an acoustic perspective, TV recording typically uses cardioid microphones, which provide insufficient spatial impression. Due to close pickup distances, captured sound lacks clarity. Without spatial rendering, the entire recording essentially fails. Disconnected sound sources and excessive detail make the final TV program unsatisfactory.

3. Main Microphone Placement Methods

3.1 Wall-Mounted Placement This placement uses omnidirectional microphones that can capture stage reflections and collect substantial reinforced sound signals. However, the resulting recording is overly dense and slightly muddy, failing to properly represent accompaniment instruments. This method can be decisively abandoned for TV Peking opera recording. While it creates good spatial texture, it compromises speech clarity and is therefore undesirable. Although this approach somewhat captures a full audience effect, any attempt to adjust the main microphone position not only alters the track but also immediately breaks the spatial impression, making the method unimprovable and the results unsatisfactory.

To minimize external influences on microphones, adjustments were made to microphone combinations and placement positions, with research conducted on main microphone positioning. Computer technology can be used pre-recording to simulate microphone effects and prevent unnecessary errors. If a microphone is placed directly in front of the speaker, audiences hear brighter, clearer sound; the closer the microphone is to the speaker, the darker the sound becomes. Consequently, greater distance from center reduces high frequencies. Furthermore, the distance between speaker and microphone affects timbre. Since different

venues may yield different placement effects, not all configurations are suitable, though they remain valuable for reference.

3.2 Distant-from-Audience Placement This approach employs cardioid microphones for sound pickup. These microphones capture minimal low-frequency content, producing a thinner sound compared to wall-mounted placement. With less reinforced sound intrusion, clarity is significantly improved, and spatial impression is somewhat enhanced—cardioid microphones provide better spatial rendering during recording. This method is generally used in TV drama filming, clearly capturing performers' voices. While its drawback is insufficient audience sound pickup, this conveniently ignores external workers' voices, making it effective for TV drama recording. Due to the distance from the audience, detailed recording effects are suboptimal. Therefore, using this microphone alone would not achieve ideal results; it should be combined with others to meet TV recording requirements.

3.3 Figure-8 Microphone Placement This microphone placement directs its sensitive lobes toward the walls, typically using two figure-8 microphones with their main axes facing the stage side walls, and their least sensitive areas toward the audience and reinforcement speakers. Consequently, most captured sound consists of side-wall reflections, with minimal audience and reinforcement effects recorded. This is more effective for TV programs that do not require audience reaction. In Chinese music festivals or concerts, figure-8 microphones create perfect overall spatial impression and are often used as auxiliary tools combined with other microphones in large-scale performances. Since capturing audience sound is difficult, caution is needed when using them alone.

3.4 Close-Range Cardioid Microphone Placement This configuration combines four cardioid directional microphones, effectively leveraging cardioid advantages. These microphones are suspended to avoid wall interference, exposing them to open air to prevent directional microphone sound from being obstructed. Their test results are excellent, accurately capturing authentic audience sound with good localization. Due to proximity to the audience, reinforcement signals and reflected sound are essentially negligible. Placement of these microphones is also quite particular. To eliminate crackling sounds in the recording, they must be combined with other microphones using different placement methods to create different...

3.5 Ground-Level Placement This placement positions microphones at the stage edge, close to the audience. This arrangement directs the rear of the cardioid pattern toward the speakers, reducing reinforced sound. The microphone cannot record amplified signals, and overly wide angles provide no advantage, resulting in unsatisfactory pickup effects. Overall, this placement yields the poorest results with essentially no usable advantages.

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