

A Comparative Study of the Sound Systems Used by Sound Horeg
Rajawali Audio and JL Music at the Artes Squad Anniversary
Festival in Jombang

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Article Details	ABSTRACT
<i>Article History</i> Received September 2, 2025 Revised July 10, 2026 Accepted July 15, 2026	This study aims to compare the sound systems used by Rajawali Audio and JL Musik at the Artes Squad Anniversary Festival. The process began with a description of the sound system setups, followed by an analysis of the results by both vendors. The data in this qualitative case study were analyzed by following a cycle of data collection, reduction, and verification of findings to arrive at accurate conclusions. Based on the analysis, it can be concluded that, in terms of technical sound setup, both vendors took a similar approach. The absence of an input source was the main distinguishing factor for JL Musik. Regarding audio quality, Rajawali Audio excelled at producing powerful low frequencies for maximum “horeg” effects. Meanwhile, JL Musik prioritizes clarity and midrange balance, though its subwoofer performance does not yet match Rajawali Audio's intensity.
<i>Keywords</i> Comparison Sound System Sound Horeg Analysis	
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1. INTRODUCTION

Essentially, a sound system is an integration of audio equipment designed to process signals from various sources to amplify sound intensity, thereby enabling auditory information to reach an audience across a wider range (Sahuri, 2024). A sound system is defined as a set of audio equipment that processes sound vibrations from a primary source through stages of amplification and projection. Sound systems function as a medium for conveying messages in musical works (Kristiandri et al., 2021). This allows sound—whether vocal or instrumental—to be received by the human ear at a higher intensity (Harianto & Linggar Famukhit, n.d.). Sound systems in Indonesia today are deeply integrated into local cultural practices. Various forms of tradition and artistic performances, such as wayang kulit, kuda lumping, and dangdut, use sound systems to expand their audience reach. Using this technology, individuals located at a relatively distant point from the center of the activity can still clearly receive audio information about the performance. In several regions, particularly on the islands of Java and Sumatra, sound systems play a crucial role in organizing traditional art performances and various customary activities. The implementation of sound systems has expanded in scope, with this technology now widely integrated into various national and regional events, including cultural activities such as traveling carnivals (Allya Salsa Bilatul Kh et al., 2024). Creativity is the quality of always seeking new things, while innovation is the quality of applying creative solutions (Suwahyono et al., 2023). As technological advancements improve sound system quality, this phenomenon has also sparked competition among owners and rental service providers. In the context of community activities, particularly at events such as carnivals, sound systems have become a key focus. This is due to a shift in the function of sound systems—from merely serving as technical support equipment to also acting as a symbol of prestige in an event.

performances and presentations. The resulting competition has subsequently influenced public opinion on the use of sound systems. While these devices were initially used to meet communication needs—ensuring that sound could reach a wide audience—their function has now expanded to serve as a means of fulfilling personal satisfaction and demonstrating social status. Although their basic function as sound amplification devices remains intact, their practical use has shifted into a status symbol within society. This situation has even driven some people to allocate significant funds to achieve this sense of satisfaction. This phenomenon, which initially emerged in specific regions, has now spread widely across Indonesia, particularly on Java. Because it has persisted over a relatively long period, this practice has ultimately evolved into a new cultural norm in people's lives. Some people also refer to this phenomenon as “sound horeg,” a term for the characteristic high-intensity sound accompanied by vibrations that can be physically felt. These vibrations are produced by the dominance of low frequencies (bass), a main feature of this sound system (Allya Salsa Bilatul Kh et al., 2024).

To create a lively atmosphere and capture the public's interest, Indonesians often use “sound horeg” in various collective events. This audio phenomenon appears in contexts ranging from religious celebrations and street concerts to state events such as the October 2024 presidential inauguration in Jakarta. It is precisely this use of extreme sound frequencies in public spaces that has sparked heated debate across society. This phenomenon of high sound intensity is often paradoxically perceived as a prestigious form of entertainment, even though its physical impact can cause structural damage to buildings and permanent hearing impairment. In the organization of carnival events, “sound horeg” plays a crucial role as a key supporting element. These regularly held events serve both as cultural expression and as entertainment for the community (Suhala, A. W., 2025). On the other hand, there are indications of local authorities' support for the existence of “*sound horeg*” as a tool for cultural promotion, which (Arie Setiawan, 2025) unfortunately tends to overlook the projected long-term impacts on the community's well-being and quality of life. This phenomenon has sparked various debates within the community. In certain contexts, “sound horeg” is viewed as a symbol of prestige and an indicator of the level of festivity within the community's social structure. This phenomenon has undergone enculturation into a local tradition, where high-intensity sound serves as the primary attraction, facilitating public gatherings and providing emotional fulfillment for its stakeholders (Arie Setiawan, 2025). The “*sound horeg*” phenomenon in East Java has become a significant manifestation of popular culture among youth. This practice involves the use of high-intensity sound systems as the primary instrument in communal activities—such as parades and competitions—which serve as spaces for the articulation of identity and collective entertainment (Fikri, M., & Baharun, H., 2025). The organization of “*sound horeg*” parades presents a paradox in the public sphere; on the one hand, it catalyzes local economic growth and mass entertainment, but on the other hand, it triggers various complex social and environmental issues (Wulan Aprilian & Dewi Poerwanti, 2025). One remote rural area in East Java is known for its strong preservation of the “sound horeg” tradition, which has become an integral part of local customs, enlivening every community event. This area is located in Jombang Regency, East Java.

The use of high-volume sound systems has become an integral part of major celebrations in Kedung Betik Village, Kesamben, Jombang. Afif, a resident, explained that every RT and RW there has a main sound system that is activated simultaneously to liven up commemorations such as Heroes' Day or the Independence Day carnival. This tradition fosters healthy competition among residents to deliver the best audio quality in public spaces. The sound systems used are typically configured unconventionally—by combining several large speakers to produce high sound intensity, a phenomenon known locally as “sound horeg.” For the people of Kedung Betik Village, sound horror is considered a key element in creating a festive atmosphere. This has made high-intensity sound installations a mandatory feature at nearly all major celebrations in the village. Additionally, the smooth execution of various village activities is supported by the local organization, Artes Squad.

Artes Squad is a community-based organization that serves as a forum for the youth association and consists of active young men and women in Kedung Betik Village. According to Afif, the organization was formed on the initiative of the village's youth on February 7, 2023, and subsequently received support from village officials, including RT and RW leaders. Since then, Artes Squad has been actively organizing various activities in Kedung Betik Village. As of 2025, Artes Squad will celebrate its second anniversary. To commemorate this anniversary, the Kedung Betik village government, with support from the owner of the vendor JL Musik, organized the Artes Squad Anniversary Festival on February 7, 2025. The event took place in Kedung Betik Village, Jombang Regency, from 9:00 PM to midnight WIB. Given the strong tradition of using “sound horeg” in the village and the vendor JL Musik's support, the organizing committee decided to feature a collaboration between JL Musik and Rajawali Audio's sound systems at the festival. In total, the equipment used included 24 subwoofer speakers and 36 midrange speakers, a combination of systems from both providers.

The “sound horeg” phenomenon has elevated Rajawali Audio from Surabaya and JL Musik from Jombang to key players in the sound equipment rental industry. At various festivals, the technical differences

Between the two, the speaker choice is clearly evident; large-diameter speakers are key to producing earth-shaking bass. Their collaboration at the Artes Squad Anniversary Festival marked an intriguing turning point, where the combination of layout and technical specifications from both vendors produced a new, highly complex, and unique sound configuration for attendees. This situation prompted the researcher's interest in conducting further study. Given that "sound horeg" is closely tied to audio systems that require proper sound design, sound design quality is a critical factor in achieving optimal "horeg" effects. Good, balanced sound design also affects the audience's level of comfort. Therefore, this study focuses on the technical aspects and a comparison of the "sound horeg" setups implemented by Rajawali Audio and JL Musik at the Artes Squad Anniversary Festival. This phenomenon indicates a reorientation of cultural values in East Java stimulated by technological integration. This shift reflects how technological tools can reconstruct traditional practices into new, more contemporary forms of cultural expression (Cahyani, M. D., 2025).

A literature review of relevant prior research serves as a fundamental basis that guides the researcher in determining the direction, mapping the context, and broadening understanding of the issues under study. The first prior study was a thesis conducted by a previous researcher, Della Lesgasevia, S. (2024), from the Faculty of Law at Muhammadiyah University of Malang. This study analyzed the implementation of legal instruments and regulations regarding noise thresholds for the use of high-intensity sound systems (*sound horeg*) in the Karangploso subdistrict. The second is a thesis by Moh. Khoirul Sahuri (2024) from the Faculty of Sharia and Adab, Sharia Economic Law program, at Nahdlatul Ulama Sunan Giri University in Bojonegoro. This study aims to analyze the implications of using high-decibel sound systems on the sociopsychological conditions of the Bojonegoro community. Additionally, this study conducts an in-depth analysis to evaluate the consistency of Diva Audio's operational practices with the principles of Islamic business ethics, determining whether these business activities meet Sharia compliance criteria or, conversely, contain contradictions. The third is a journal article authored by Allya Salsa Bilatul, Diajeng Anugrah, and Fatkhurohman (2024) from the University of Jember. This article examines the evolutionary trajectory of sound systems within society, which have transformed from merely functional devices into instruments of social competition. This analysis traces the sociocultural process to its culmination in the formation of the "sound horeg" phenomenon as a new identity in public entertainment. The fourth study is a journal article by Dahri Oskandar, Ari Palawi, and Nurlaili (2019) from Syiah Kuala University in Aceh, Faculty of Teacher Training and Education, Department of Drama, Dance, and Music Education. This study analyzes sound design techniques in ethnic musical compositions during the opening ceremony of the 7th Aceh Cultural Week (PKA). Its primary objective is to comprehensively describe the methodology of acoustic arrangement and sound reinforcement techniques applied, thereby serving as an informative reference for researchers in the field of sound design. The fifth study is a journal article by Angkoso (2022) from the Production Studio Engineering Management Program at the Yogyakarta School of Multimedia. This journal article discusses the application of sound design techniques in the "Kethoprak Mataram" broadcast program, which airs every Sunday evening on RRI Yogyakarta.

2. METHOD

A qualitative case study approach was used to analyze the research focus comprehensively. In line with the nature of qualitative research, the resulting data presentation emphasizes the power of textual descriptions and narrative exposition. The data were systematically collected using various data collection instruments consistent with the qualitative paradigm (Mappasere, S. A., & Suyuti, N., 2019). The research object is the entity or phenomenon that serves as the central focus of a study to address the systematically formulated research problem (Dartiningsih, B. E., 2016). The formal object of this study is a comparative analysis of sound systems. In contrast, the material objects examined include the "sound horeg" used by the vendors Rajawali Audio and JL Musik. Within the qualitative research framework, data collection is typically conducted by integrating various techniques to ensure comprehensive information is obtained (Data, A., 2014). Data collection techniques include observation, interviews, and documentation. Observation is a primary data collection method conducted through direct observation and in-depth attention to the research subject. This practice utilizes sensory perception to capture reality in the field, whether in the form of behavior, events, or physical conditions that are the focus of the research (Data, T. P., 2019). Methodologically, a qualitative interview is defined as a guided discussion that combines an informal approach in the initial stage with the exploration of systematic questions to uncover the perceptions or experiences of research subjects (Rachmawati, n.d.). Documentation is a structured process of collecting and managing documents as sources of both primary and secondary data. This activity aims to extract substantive information that serves as a basis for evidence and to provide scientific references (Widyawardani Budiarto, n.d.).

Data analysis is a crucial stage in the research cycle, carried out after comprehensive data collection, to develop solutions to the problems under study (Muhson, A., 2006). Data analysis involves the taxonomic organization and thematic grouping of field findings, which serves to simplify the complexity of the data into more structured information (Octaviani, 2019). The data analysis process comprises three main stages: data reduction, presentation, and conclusion. During the reduction phase, information is systematically managed—

including the selection, simplification, and transformation of raw data from field notes into a more organized form. This stage aims to organize the data to focus more on the relevant research substance (Agusta, I., 2003). Data reduction involves selecting, focusing on, simplifying, abstracting, and transforming data from interviews, observations, and documentation. Data presentation is carried out after reduction to display structured information, thereby enabling conclusions to be drawn. Conclusions result from interpreting the data's meaning in alignment with the research's focus and objectives. The initial findings of this study are positioned as tentative hypotheses that require further testing. The validity of these conclusions will be re-evaluated based on the sufficiency and strength of the supporting evidence obtained during the subsequent field observations (Afiyanti, Y., 2008).

Data validity and reliability are considered crucial parameters in determining research quality standards; therefore, ensuring they are met is imperative in every scientific analysis process (Afiyanti, Y., 2008). Data validity is tested through triangulation techniques, including source, methodological, and temporal triangulation. To ensure the validity of the findings, source triangulation was applied by cross-checking data using diverse methods and various informant sources to validate specific facts (Rahardjo, M., 2010). Source triangulation compares information from various sources (interviews, documents, observations) to enhance data reliability. To maintain the objectivity and reliability of the research, a methodological triangulation strategy was applied, involving repeated verification of data from similar sources. This is done by contrasting data from semi-structured interviews with findings from field observations and document analysis, thereby yielding a consistent and accurate understanding, such as comparing in-depth interview results with data from participatory observation (Mekarisce, A. A., 2020). Credibility testing was also conducted through temporal triangulation, in which the researcher cross-checked informants' responses by asking identical questions at different times. The concept of temporal triangulation refers to the influence of temporal aspects on data validity, in which re-examination is conducted over varying time frames to ensure the accuracy and authenticity of research findings (Vera Nurfajriani et al., 2024).

3. RESULT

The landscape of Kedung Betik Village—the venue for the Artes Squad Anniversary Festival—is characterized by vast rice paddies and open spaces. Located in the Kesamben subdistrict of Jombang, the village is about 17 kilometers from the city center, with Kalang Anyar Hamlet serving as the specific venue for the event. Furthermore, the village's relative distance from the urban center has shaped the social and cultural conditions of the local community. In the daily life of Kedung Betik Village, there is a tradition regularly observed during major holidays. The term “sound horeg” originated from the residents' custom of simultaneously blasting high-powered audio systems during every celebration at the RT and RW levels. The use of this high-intensity sound serves as a key element that enlivens important moments in the area.

To understand the impact of different audio setup techniques on sound quality, this study conducted an in-depth analysis of Rajawali Audio and JL Music at the Artes Squad Anniversary event. As two major players in the world of “*sound horeg*,” these two vendors offer distinct technical approaches to achieving extreme sound intensity. Descriptions of the setup methods and the final results of the sound systems implemented by both vendors form the core of this research.

A. Sound Design Techniques of Rajawali Audio and JL Musik at the Artes Squad Anniversary Festival

This subsection examines the sound system architectures of Rajawali Audio and JL Musik at the Artes Squad Anniversary event. The researcher documented the equipment details, signal *routing* maps, and the system's operational logic comprehensively. Additionally, the strategic roles of various hardware components and supporting *software* within this audio ecosystem were analyzed in detail. Further explanations are presented as follows.

Rajawali Audio's Sound Design Techniques

Rajawali Audio is known for systems that prioritize *bass* power. This is evident in the selection and quantity of equipment used. Based on the underlying theory, Rajawali Audio's sound system comprises three main components: the input source, the processing system, and the output source. An explanation of each component is provided below.

Rajawali Audio's input source begins with a Dell laptop running Smart Live software, which monitors sound frequencies in real time. The audio signal from the laptop is then routed to a Focusrite Solo audio interface. From the Focusrite Solo, the stereo signal is routed to the Midas M32R digital mixer, which serves as the main control center. Additionally, two Phase Lab wireless microphones are connected directly to this mixer to complete the input sources.

The signal processing stages begin after the audio signal undergoes primary processing on the Midas M32R mixer. Next, the signal is distributed through four output channels to two DLMS (Digital Loudspeaker Management System) units that play a crucial role in the entire system: the SPL DP 480 and the Ashley DSP 4.8. These DLMS devices play a crucial role in balancing the signal output and distributing it with precision. From the incoming signal, these DLMS units can generate 16 different outputs, each.

connected to one of 17 power amplifiers that amplify the signal before it is sent to the speakers. This process ensures that every frequency is managed optimally.

The output destination for Rajawali Audio is the speakers themselves. In total, Rajawali Audio uses 26 speaker units to deliver a powerful sound experience. The subwoofer section is the main highlight, featuring a combination of 8 B&C 18-inch subwoofers and 8 Betavo 21-inch subwoofers. All of these subwoofers are housed in Kimochi enclosures, renowned for their ability to produce thunderous bass. The speaker placement configuration is symmetric, with the 18-inch subwoofers flanking the 21-inch subwoofers—a strategy aimed at maximizing sound impact and bass dispersion. To complete the frequency spectrum, mid-range drivers and tweeters are also layered, ensuring the sound is powerful at low frequencies and rich and detailed in the mid and high frequencies, creating a balanced, full audio experience.

JL Musik's Sound Design Techniques

JL Musik prioritizes frequency balance and avoids the dominance of any single frequency, focusing instead on evenly distributing sound. Optimal audio quality is achieved by integrating three interconnected components: the input source, the processing mechanism, and the output source. These three are classified as a single unit that supports the overall sound system functionality.

Unlike Rajawali Audio, which has an independent input source, JL Musik employs a more efficient strategy by sharing the input signal directly from the Rajawali Audio mixer. Their operator, Lutfi, explained that this approach was adopted to minimize potential miscommunication and improve operational efficiency. The received signal is then routed directly to JL Musik's advanced digital mixer, the Midas M32R, which serves as the main control center of their system. JL Musik's processing system is essentially the same as Rajawali Audio's. The audio signal from JL Musik's mixer is then distributed to two DLMS units: the XTA DPS 48 and the Ashley DSP 4.8. Although these devices have a capacity of up to 16 output channels, in practice JL Musik uses only 11, connected to 11 power amplifiers.

After the Midas M32R mixer receives the audio signal, it is then routed to two DLMS (Digital Loudspeaker Management System) units: the XTA DPS 48 and the Ashley DSP 4.8. Although both DLMS units have a capacity of up to 16 output channels, in practice JL Musik uses only 11 channels to meet the system's needs. Each of these outputs is connected to one of 11 power amplifiers, which amplify the signal before it is sent to the speakers, demonstrating a focused, non-excessive approach.

In terms of output sources, JL Musik uses 28 speakers in a compact yet powerful setup. For low frequencies, they use 12 18-inch B&C subwoofers arranged vertically in CLA enclosures. This vertical configuration is designed to maximize sound pressure and ensure even bass distribution. Midrange frequencies are handled by 8 10-inch Line Array speakers, known for their precise sound dispersion. Rounding out the sound spectrum, high frequencies are handled by 8 10-inch Tasso tweeters. This combination of 28 speakers delivers a full, balanced sound spectrum, from deep bass to clear treble.

B. Sound Setup Results by Rajawali Audio and JL Musik at the *Artes Squad Anniversary Festival*

This subsection presents an analysis of sound design practices in the field, following the identification of the range of techniques and components employed by JL Musik and Rajawali Audio. The research findings are classified into three main aspects in accordance with the theoretical framework: frequency settings, sound intensity levels (decibels), and sound characteristics.

Thus, the researchers will describe the frequency settings, sound intensity levels measured using a decibel meter, and the sound characteristics produced by both vendors. These three aspects serve as the primary parameters for a comparative analysis to determine each vendor's sound tuning results. A detailed explanation is presented as follows.

Sound Configuration Results for Rajawali Audio

Frequency settings for Rajawali Audio: According to Doni, the operator at Rajawali Audio, he applies an aggressive low-cut filter at 30 Hz to control excessive low frequencies. This step is crucial to prevent damage to the speakers and maintain sound balance with JL Musik's setup, ensuring no frequency overlap. However, Doni acknowledges that this approach indirectly affects the overall sound character, making it more focused on higher frequencies.

The recorded decibel data demonstrates just how powerful Rajawali Audio's sound is. At a distance of 50 meters from the stage, decibel (dB) levels were recorded between 119.4 and 119.8. Even at 150 meters, the sound remained very powerful, registering 117.9 dB. Nevertheless, this sound intensity is variable and highly dependent on the audio content being played, particularly how dominant the bass frequencies are in the song.

According to Doni and Irfan, Rajawali Audio speakers have a dark sound with a dominant low-frequency response. The *mid-range* speakers are considered too weak to balance out the massive.

subwoofer, resulting in less-than-optimal clarity for vocals and instruments. However, for fans of the “horeg” sound like Afif, these characteristics actually create a satisfying audio experience with a “horeg” vibration effect that’s powerful yet “soft” on the ears.

Results of the JL Music Sound Setup

JL Musik Frequency Settings: Lutfi, the operator of JL Musik, carefully adjusts the frequency settings to create a balanced and comfortable listening experience. He applies a mid-cut of approximately -5 dB at 500 Hz and a high-cut of approximately -10 dB at 4 kHz. These settings are intended to attenuate excessive frequencies in the mid and high ranges, which, if left unchecked, can produce a shrill sound that is distracting and uncomfortable to the ears. This approach demonstrates that JL Musik prioritizes not only sound power but also quality and listener comfort.

Decibel measurements show that JL Musik’s sound output is lower and more controlled than Rajawali Audio’s. At 50 meters, the decibel level was 113.9 dB; at 150 meters, it dropped to 111.1 dB. The consistency of this data confirms that JL Musik does not prioritize volume as much as Rajawali Audio. They choose to focus on sound clarity and balance, rather than pursuing extremely high decibel levels.

JL Musik’s sound characteristics tend to be bright and offer good clarity, especially in the mid- and high-frequency ranges. Irfan corroborated this view, stating that JL Musik’s *mid-range* is clearer. However, due to its focus on mid-range frequencies, JL Musik’s *subwoofer* is considered less powerful than Rajawali Audio’s. Afif, as an audiophile, even described JL Musik’s sound as “shrill and painful to the ears” due to the dominance of high frequencies.

4. CONCLUSION

Although there are significant differences in terms of the number of devices, frequency management, and speaker arrangement techniques, Rajawali Audio and JL Musik still use a uniform *routing* pattern. This pattern involves integrating the mixer, DLMS, and speaker power units as the primary audio signal distribution path. This demonstrates that the fundamental similarities in the system workflow are maintained despite differing technical specifications among vendors. At Rajawali Audio, the midrange speakers are arranged horizontally above the subwoofers. Meanwhile, at JL Musik, the midrange speakers are arranged vertically upward and slightly further forward than the subwoofers. These differences in speaker placement configurations affect the final sound quality produced by each vendor. In addition, the technical settings applied by operators from each vendor also influence the resulting sound characteristics, as each operator has different preferences and approaches to configuration.

The differences greatly influenced the audience’s listening experience at the Artes Squad Anniversary Festival, particularly in the sound character, between Rajawali Audio and JL Musik. While Rajawali Audio prioritizes high volume and a thrilling “thump” effect driven by dominant low frequencies, JL Musik opts for a clearer, more balanced midrange sound. The weaknesses of each—a lack of vocal clarity with Rajawali Audio and a lack of bass intensity with JL Musik—create a contrast in performance that gives each vendor’s sound system a distinct character.

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