Condenser Microphone

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***Abstract*—For the application of accurate voice reproduction, a cost-effective condenser microphone design is considered. Analysis of theoretical characteristics such as sensitivity, dynamic range, and signal-to-noise ratio is presented. In conclusion, quantitative measurements from a working prototype are corroborated with the theoretical analysis and compared against desirable performance criteria.**

***Keywords*—Capacitive, Condenser, Microphone.**

I. Introduction

THE accurate transduction of sound into an electrical signal is naturally useful for conveying the human voice. People generally speak at 40 to 60 dB SPL and can hear sound from 20 Hz up to 20 kHz with especial sensitivity to the 1 to 4 kHz region.[1] For the application of accurate sound reproduction, the designer should strive for unity-gain response in these ranges, particularly in the 1 to 4 kHz range.

A variety of devices exist for transducing sound. Of commercially viable designs, condenser and dynamic microphones are the most common.[2] Fig. 1 illustrates response differences between typical condenser and dynamic microphones in the band of interest. The condenser microphone (in red) experiences less attenuation at the extremes and provides greater uniformity in between. It is not unusual for condenser microphones to have an upper 20 kHz frequency limit compared to the typical 16 kHz limit of dynamic microphones.[3] Additionally, the condenser microphone has notably less gain in the 1 to 4 kHz region people are most sensitive to, providing a considerably more balanced response. Taken altogether, condenser-based designs are preferable for applications desiring accurate reproduction.

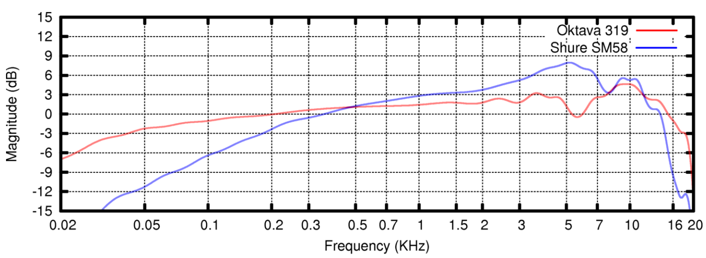

Fig. 1: *Oktava MK-319 condenser microphone[4] and Shure SM58 dynamic microphone[5] (20 Hz to 20 kHz)*

II. Sensor Structure and Measurement Principle

The layout of the sensor portion of the condenser microphone is depicted in Fig. 2. The

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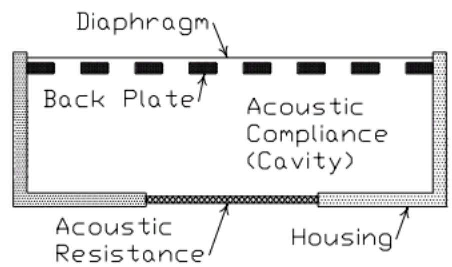

Fig. 2: Condenser microphone structure[6]

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III. Conclusion

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Appendix A
Proof of the First Zonklar Equation

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Appendix B

Appendix two text goes here.

Acknowledgment

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