TECHNICAL DESCRIPTION

This description explains the purpose of each part of the SM58 dynamic microphone. The challenge was to find the best way to explain it all to an audience who knows very little about microphones.

I learned how to organizing graphics into a document during this project. Having this skill has not only helped me out as I continued in the technical writing class, but it has also made a difference in my documents at work as well as in other classes.
I. Introduction
The Shure SM58 dynamic vocal microphone is designed for professional sound reinforcement and recording applications. The SM58’s cardioid (heart shaped) pickup pattern (Figure 1) captures more of the sound in front of the microphone. The SM58 is a dense and durable microphone. Weighing in at 10.5 ounces, it is only 6 3/8 inches tall. It is 2 inches wide at its widest point and 29/32 inches at its narrowest. The Shure SM58 (Figure 2) consists of five main parts: the cartridge, the transformer, the XLR connection, and the casing.

II. Main Parts

Mesh Grill
The silver colored, steel mesh circular grill covers the wider end of the microphone casing (Figure 2). The mesh grill is 2 inches in diameter and 1 ¾ inches in height. Its main purpose is to protect the microphone cartridge in case the microphone is dropped or struck. The reason the grill is mesh is so sound isn’t obstructed.

Cartridge
The cartridge (Figure 3) is a plastic cylinder with a small circle of brass mesh filling in the opening of the cylinder. Within the plastic cylinder of the cartridge is the diaphragm, which is moved by sound waves. Once the sound waves have been converted into an electrical signal, the signal is sent through two wires. The transformer inverts the signal through one wire while the other signal remains unaltered. The reason for this will be better explained in the XLR connection section.

Transformer
The transformer is an electrical device consisting of two separate wires wrapped around a single coil. The purpose of the transformer in the SM58 is to invert the audio signal for noise reduction. This is explained in more detail with the XLR connection.

XLR Connection
The XLR connection is a cable connection that allows the microphone’s signal to be transmitted to other audio devices. There are three pins used to connect the microphone to an XLR cable. The three ½-inch pins are recessed into the narrow end of the casing. This prevents the pins from being bent when the microphone is not in use and provides a receptacle for the XLR cable to be secured.
The XLR itself (Figure 4) consists of three connections: ground (X), left (L), right (R). The reason three connections are used is to reduce the noise added to the signal as it travels through the cable. The same audio signal picked up by the cartridge is sent through both the left and right connections. The only difference between the two is that the transformer inverts one. Once the two signals have reached the pre-amp or sound console the signal that was inverted at the microphone is inverted again. This way, any noise that was added to the signal through the cable is out of phase with itself and will be canceled out. This method of noise reduction has made the XLR the standard microphone connection.

**Casing**
The tubular die cast casing tapers from a maximum diameter of 6 3/8” to 29/32” at the minimum. The case acts as a handle for the performer while also protecting all internal connections and the XLR connectors.

**III. Conclusion**
The mesh grill and the casing both protect the cartridge, the transformer, and the XLR connection. The cartridge mounts into the wider opening of the casing and the mesh grill is then threaded over the cartridge. The XLR connector allows the microphone’s signal to be transmitted through other audio devices. The mesh grill can only protect the cartridge from so much though. A severe hit could damage both the mesh grill and cartridge. The movement of the diaphragm also has its physical limitations. The average human ear can hear frequencies from 20 Hz to 20 kHz. The SM58 can only respond to frequencies between 50 Hz and 15kHz.