

# MICROPHONES

## Part 4: Microphone overload; plugs and connections.

Reproduced by courtesy of Sennheiser Electronics, this series of articles is intended to assist sub-professionals and amateurs who need to use microphones, but without the advantage of formal acoustic training. This article discusses microphone overload and the problem of microphone plug and connection standards.

by G. PRAETZEL and E. F. WARNKE\*

**SOUND PRESSURE DISTORTION:** When the input of a tape recorder or an amplifier is overloaded, harmonic distortion occurs. Can microphones be overloaded in the same way? This question cannot be answered generally, as there are differences between moving coil microphones and capacitor microphones.

During tests of dynamic microphone type MD 421 test persons with a powerful voice were asked to shout at the microphone from the closest possible talking distance. The highest sound pressure produced was 500 bar, and the voltage delivered by the microphone was about 100mV. This corresponds to a loudness just on the threshold of pain for the human ear. However, the harmonic distortion remained below 0.5%; below the threshold of perception.

Some capacitor microphones, however, can show audible overload at such extremely high sound volumes. Fortunately, levels of this order are not normally encountered in everyday microphone applications. If, however, such conditions do occur, eg, when the microphone is placed near a loud brass instrument, then it should be ascertained that the capacitor microphone is designed for the expected high sound pressure. In a doubtful case, it is better to use a dynamic microphone.

**CONNECTION PROBLEMS:** It would be nice to have a world-wide standard microphone connector plug with a mating socket. Unfortunately, the abundant ideas on the design of plug connectors and the scope of contact combinations by equipment manufacturers make the universal solution well nigh impossible. During the first attempts at standardisation on a national scale, so many solutions were offered that, in spite of recognising generally the necessity for standard connections, great difficulty was experienced in working out standard

specifications which would not inflict considerable economic losses on users of existing types.

**DIN STANDARD MICROPHONE PLUG CONNECTIONS:** Fortunately, in West Germany and those European countries which it supplies with tape recorders and sound equipment, the microphone plugs and sockets conform to DIN 41524. DIN 41594 is so manifold, however, that a microphone with the above mentioned plug (Fig. 14) may not match electrically every socket into which that plug fits mechanically.

Granted, one can assume that today a great majority of the tape recorders on the European market are fitted with these connecting sockets wired to one of the six (!) diagrams shown in Fig. 15. However, none of these six different wirings is necessarily interchangeable with another one. This results in a relatively high number of possible mispairings, where a microphone wired to a standard specification, connected to a microphone input wired to another variant of this standard will either provide an unsatisfactory result or no result at all.

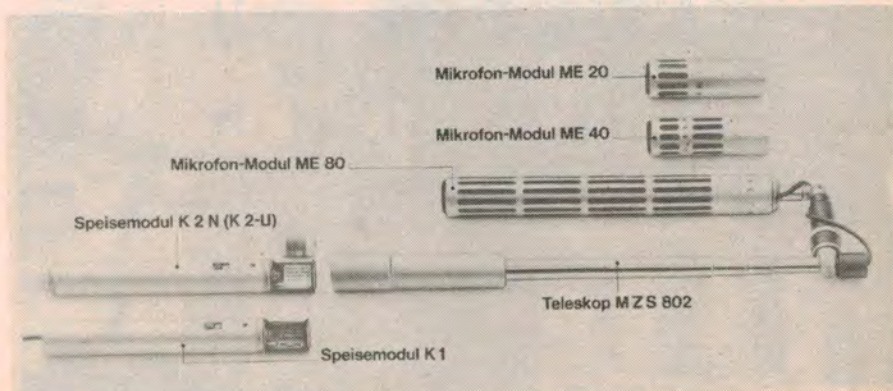
**ALTERNATIVE MICROPHONE PLUGS:** Besides the above mentioned standard plug and connections there are, especially in overseas tape recorders,

various alternative plugs, such as Cinch plugs, and several types of jack connectors. With the exception of the stereo jack connector with a 6.3mm diameter. (Fig. 16) which provides for both channels of a stereo recording, other plug connectors are only two-pole; the "live" pole and the screen. This facilitates considerably the manufacture of suitable adaptor-cables.

**MICROPHONE CONNECTION MANUAL:** There are, on the European market, DIN standard plugs with various standard wiring arrangements, as well as various alternative plugs, all adding up to a somewhat chaotic situation.

This moved Sennheiser to investigate all tape recorders on the European market and catalogue them according to their microphone input sockets and wiring. The result of this extensive work is a manual published every year called "Mikrofon-Anschluß-Fibel". It contains diagrams for the connections between microphone plugs and corresponding sockets of tape recorders.

(Copies of the latest "Mikrofon-Anschluß-Fibel" are available on request from the Australian Sennheiser agents; R. H. Cunningham Pty Ltd, 493 Victoria St, West Melbourne, Vic. 3003, or 4 Waters Rd, Neutral Bay, NSW 2089.)

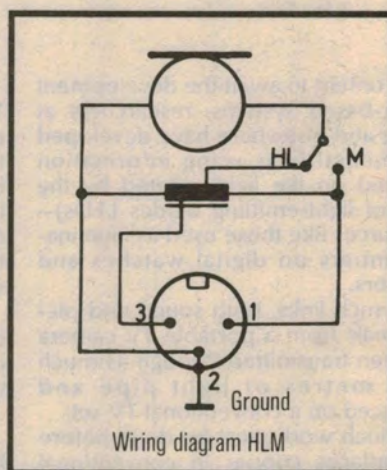
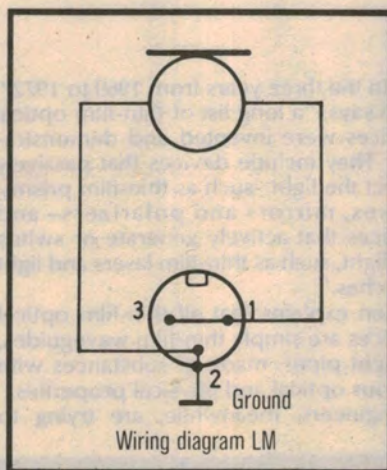
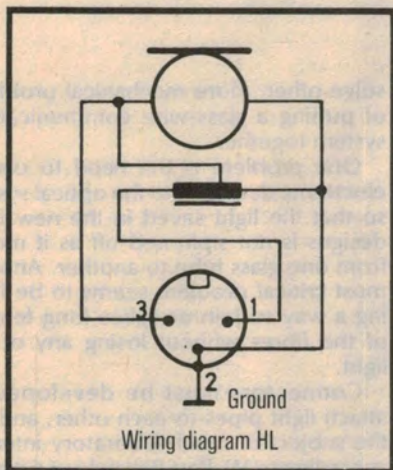
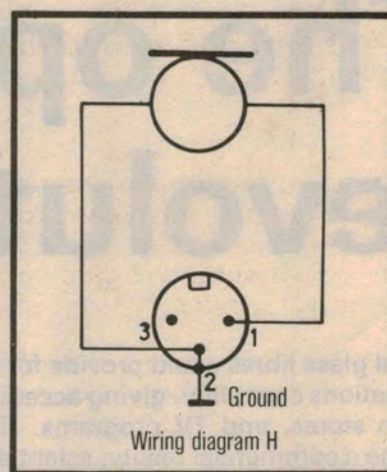
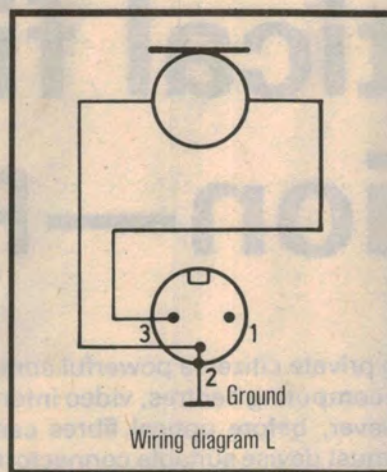
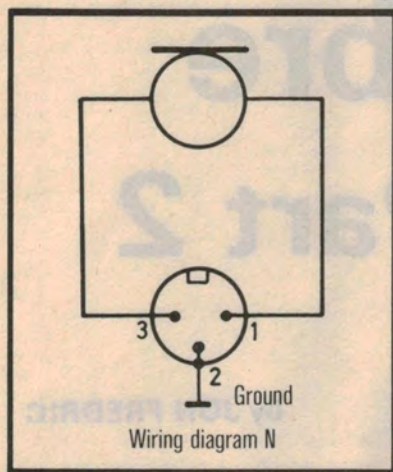


Typical of modern microphones is this multiple head system by Sennheiser. The ME20 head gives a spherical response, the ME40 a super cardioid, and the ME80 a super cardioid below 1000Hz and a sharp frontal lobe above this.

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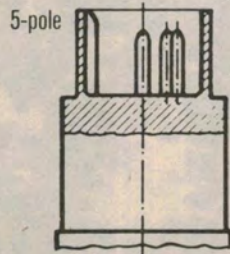
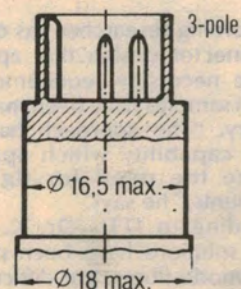
# Standard DIN-Microphone Connections

Fig. 15



Plugs for microphones to DIN 41524

Fig. 14



Pin numbers on the connecting side of the cable



Fig. 16

The non-standardized jack plug with a 6.3 mm  $\varnothing$  used for microphones as well as for headsets.

