

Wings and early reflections

When recording music or speech the microphone is usually placed much closer to the source than the normal listening distance. This has the effect of reducing reflections and reverberation relative to the direct sound. This is desirable otherwise there is too much room effect in the recording.

The reason this is done is that when one listens to a source in a room, the brain tends to suppress the room effects in order to better understand the music or speech. Try blocking one ear for a moment – you will notice the sound of the room you are in increases dramatically. The brain tries to suppress sound energy arriving later than 50 milliseconds after the direct sound. Energy arriving earlier than this is integrated with the direct sound which has the effect of increasing the apparent level.

This means that early reflections are important for gathering information, especially during the first 20 milliseconds. This effect can be experienced when speaking in a forest where the trees have bare trunks, a beech forest, for example. In this case, the clarity of speech is very good even at long distances. On the other hand, if one were to speak in a completely open, snow covered field, it would be much more difficult to hear the speech at a distance. This is due to the assistance of the early reflections from the trees in the forest.

We also have early reflections in enclosed spaces; however, we also have other energy arriving later which tends to spoil things. Consequently, when recording with microphones very close to the source, we reduce the late energy but also the beneficial early reflections. One way to restore the sound of the room without increasing the amount of energy is to install Wing modules (=broadband time delay lines). They are suitable for use during recording (several recordings with Wings placed close to the mic in a concave pattern) as well as when listening.

The brain has difficulty in assimilating discrete reflections of short duration. The Wing modules have the unique beneficial effect of **each** module breaking up reflections and spreading out the broadband energy in time. This gives the brain more time to process the sound and expose different masking effects.

Development of the 'Wing' family of products has concentrated on making the effects cover as wide a range of frequencies as possible. Measurements have shown that reflection durations of a single module are extended by as much as 4 to 5 milliseconds in the dynamic range of interest to us, approximately 20dB.

Most benefit can be gained by placing this 4-5 ms extension in the time range 5-10 ms after the direct sound which results in a precise and detailed soundstage. The Wing Module has been tested in a multitude of musical contexts with positive reviews from both musicians and recording technicians alike.

The V-Wing was recently chosen from a shoot of internationally sold diffusors.

A test was conducted in a specially built classroom at a school for children with hearing difficulties. The combination of Helmholtz bass absorption created between the modules (V-shape) and the special delay line function was an overwhelming success (this unique feature was also the reason why they were chosen).

The predominant opinion was that the test classroom had very good speech intelligibility and clarity.

The use of 'Wings' or diffusors does not increase the physical energy in a space. It spreads it out in time and, if carefully positioned, over the correct time interval. This is exactly like the forest example given earlier where most people feel the experience is not uncomfortable or incorrect; quite the opposite. In support of this claim, there are many concerts held in the beech forests of Ekerö in Sweden, much to everyone's delight.

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