

Birth of a Classroom Speaker System

David Edis-Bates October 2009

“Can you help me find a winning speaker system for the classroom?” was the briefing from our customer who wanted to access the education audio market with a winning product.

Their in-house installation company used a sub-woofer with satellite speakers but the speakers were to be mounted either side of an interactive whiteboard so this was not the ideal solution. We had a photo of their sub-woofer and that of a competitor's but not a lot more to go on.

The challenge was to design an active speaker system for interactive whiteboards that met the needs of the classroom with only the minimum of customer input and to a demanding target price.

We researched the acoustic qualities expected of an average UK classroom, which was not good being a 10 metre by 6 metre room often with concrete floor and walls with windows on one side and full of desks and children. The distance from the whiteboard to the rear of the class was typically 6 metres and average background noise level of around 60dB, mostly expected from the pupils. Research suggest that the signal to noise ratio needs to be at least 15dB above the general noise level. So we were looking to design an active speaker system that was loud enough to be heard, could amplify different sources from the teachers equipment and stand up to the “rough and tumble” of a classroom environment.

We approached several manufacturers to see if they had products that met our developing specification and the target price. We tried and tested two “off the shelf” models but the suppliers

did not meet our standards for manufacture and one sample failed on extended testing and they were not suitable for the classroom. We had a favoured manufacturer in mind, they were relatively large which meant they would only be interested if the production volumes were high but they had the engineers and quality systems to get our new product into manufacture. So this product had to be a winner in the market place if this factory was involved.

The design progressed with steel speaker grilles, special security wall brackets and a wired remote control so that the teacher could control the unit without climbing on a chair to adjust the volume. When we tested a prototype in an anechoic chamber the sound levels at the speaker at 1 metre were fine but at 6 metres the sound level was far too low, were our calculations wrong?. Then it struck me that a classroom was nothing like a well designed anechoic room with sound absorbing walls. We found a room resembling a UK classroom with concrete floors, walls and ceiling of about the right dimensions. The result a resounding success and the choice of wood cabinet paid off with a better than expected sound quality.

To our delight the customer approved the product without change, the price was right and the market was just ready. We could not find a competing product with all the features that we had built-in at anything like our price. The product proved a great success, sales to this customer exceeded 20,000 units a year which met the factory minimum production runs and with only minor issues the quality levels have been better than 99% AQL.

About the Author

David Edis-Bates, C.Eng MIET has spent more than 30 years in export related activities around the world, lived in Taiwan for 4 years in the 70's and in China for the past 5 years. He also taught part time in further education for several years in the UK and is currently CEO [Edis Trading \(HK\) Limited](#) who design and manufacture audio visual products.

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