Proceedings of the Institute of Acoustics

THE NEW SOUND REINFORCEMENT AND SOUND BROADCASTING SYSTEM IN THE HOUSE OF COMMONS CHAMBER

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The use of time delay correction for improving the intelligibility of Public Address systems is a well researched topic. This paper however deals with the development of a system which had imposed upon it severe constraints both from aesthetic and practical points of view. The system in question having to be installed inside the main chamber of the House of Commons.

The impetus behind this project came from two sources: firstly the need to improve the Broadcast sound to match that of the high quality Broadcast television pictures available from the Chamber in late 1989 and secondly the gradual decline of the existing twenty year old sound reinforcement system. In order to be successful we therefore needed not only to satisfy the broadcasters but at the same time to radically improve audibility for Members inside the Chamber.

At the first meetings to discuss the project a number of elegant engineering solutions were proposed. However all of these were subsequently discarded due to their non compliance with the requirement to preserve the unique construction and appearance of this historic debating Chamber.

Basic data concerning the existing system and the requirements of any new installation were also hard to obtain since there was an absolute ban on entry into the Chamber during Parliamentary business by any persons other than elected Members. Tests had therefore to be conducted either in an empty chamber and correcting factors estimated, or by using high quality recordings of broadcast business.

Constraints on the system were numerous, but among them were: the requirement to keep microphones and cabling out of vision of the broadcast cameras; coping with widely differing sound levels inside the Chamber generated by widely differing numbers of MP's; offering simple push button operation for an operator seated adjacent to the chamber. Finally it was required to maintain the use of forward facing loudspeakers mounted inside precisely defined apertures of the Chamber's seating - in itself an almost sure guarantee of poor performance.

It became apparent that the system would need to be software configureable in order to minimise the time taken to optimise the response of the very fixed microphone and loudspeaker components. This was not only true in terms of the project schedule which left very little time for experiment but also for the daily operation of the system itself. Using a simple "one Button per Microphone" control panel the system could have to intelligently alter the level, delay and frequency shift instantaneously and do so in an absolutely repeatable and fail-safe fashion for each Member of the House wherever they were situated within the Chamber. This could obviously only be achieved with Digital signal processing techniques allied to a central computer control of multiple and assignable system functions.

HOUSE OF COMMONS SOUND SYSTEM

The accuracy of the original tests and assumptions on which the design was based was then trialled at one "Mock" session of Prime Minister's question time when an invited assembly of ex-engineers and Commons Staff were asked to comment on the audibility of the newly installed and software controlled system, configured in various modes. This led to a major reassessment of the microphone array required to give optimum results and provided valuable information confirming the most effective system setup.

The final Specification of technical equipment used for the amplification of sound in this relatively small chamber now reads quite impressively: 84 microphones - each individually amplified and controlled; 530 loudspeakers - each with its own power amplifier, delay selector and gain controller; 2 complete power distribution systems from separate Electricity sub stations; total redundancy of all critical functions and an exceptionally high degree of protection from individual component failure.

Despite the numerous constraints indicated above, the final system as installed proved its flexibility and fundamental integrity during an installation period truncated by an early return of the House at short notice. In use the functionality of the new control panel has proved valuable in providing an easy transition for the operators and the system self diagnostics are used on a daily basis to maintain the system performance.

The new House of Commons sound system has now been in use for one year, and following the success of the concepts pioneered in the lower chamber there has been agreement to Specify an installation using the same solutions for use in the House of Lords. This further system is due for completion in the autumn of 1994.