LOUDSPEAKERS
The BBC collection

Graham Whitehead describes the range of BBC-designed loudspeakers, both past and present, used in programme balance and monitoring. The detail is brief but goes some way to explaining the reasons that the design came into being, and the applications for which they may have been designed. The current range is also described.

BBC loudspeakers are designed to provide a neutral sound which is consistent and repeatable: units can be supplied and maintained over a number of years without a change in performance.

Classification

BBC loudspeakers exist under four classifications:

LS1/-- loudspeaker assemblies, miscellaneous use.
LS2/-- chassis units.
LS3/-- loudspeaker assemblies, outside broadcast use.
LS4/-- loudspeaker assemblies, studio use.

Before these classifications came into use, loudspeakers were coded LSU/--. In future, only the LS1/--, LS2/--, and LS5/-- classifications are going to be used, ie OB and studio loudspeakers will be lumped together under the LS5/-- code. There are too many individual types to cover so, in this article, I shall confine myself to the more common types of monitor loudspeaker.

Cone Materials

The type of material used to form the cone of a loudspeaker has a marked effect on the overall sound and consistency of the loudspeaker. Over the years, a variety of materials has been used.

The original material was ***paper***, which was pulped, compressed, and formed. This offered only the minimum of control over the resultant sound quality, especially in the critical midrange area, and effort was made to find an alternative.

In the mid-sixties, partially as a result of development work at Kingswood Warren, ***Bextrene*** — a kind of polystyrene — started to be used. Its major advantage was the ease by which more consistent results could be obtained by vacuum forming. The resultant sound quality could be controlled, was more repeatable from one sample to the next, and the hf response was superior. However, it was necessary to coat Bextrene with a damping compound to remove colourations in the region of 1.5 to 2 kHz. This process has never successfully been automated. The dope was applied by hand and hence the manufacturer was at the mercy of the skill and dexterity of whoever was wielding the paintbrush!

The use of plastics — notably ***polypropylene*** — developed considerably during the 1970s, again with pioneering work at Research Department. Polypropylene offered similar improvements over paper as did Bextrene. It did not need to be coated however, as the material was inherently self-damping. Because of its lower density, polypropylene yields greater efficiency than Bextrene and hence greater sound levels are possible for the same power input. This is the material currently being used for our Grade 1 monitors.

Yesterday's monitors

LSU/10
This large assembly, in an oak cabinet, was designed just after the war for general studio use. Some may still be found in service in talkback or PA applications.

The following units were used:

— Parmeko 18-inch dual concentic woofer/horn tweeter
— Lorentz LPH65 tweeter (for extended hf)
— Modified Leak TL/12 valve amplifier: 12 watts

LS3/1
A grey-painted totally-enclosed assembly for OB use. HF units were mounted on a perforated sub-baffle in front of the lf unit, to enable accurate monitoring at close range.

The following units were used:

— Plessey 15-inch paper cone woofer
— 2 x Rola-Celestion HF1300 tweeters

LS3/1A
Similar to the LS3/1 but with the bass unit replaced by a Goodmans C129/15pr.

LS3/4, and B
An angled-front assembly for mounting close to the ceiling where space was at a premium, eg. OB vehicles or above vt machines. Beware! Some of these are still in service but the surround of the bass unit fails with age and the unit is obsolete. The old ones have a gold-coloured grille cloth. There are later, current types, with a black grille and the old may be modified into the new (see LS3/4C and LS5/11 on the next page, under "Today's monitors").

The following units were used:

— Spendor BC2/8, 203mm Bextrene cone woofer
— Rola-Celestion HF1300 tweeter

LS3/5
The predecessor to the LS3/5A. Superseded when the particular bass unit used became unreliable.

The following units were used:

— KEF B110, 110mm Bextrene cone woofer
— KEF T27 27mm Mylar dome tweeter

LS3/7
Similar in size to the LS3/1 and designed to replace it. Some are still in service for talkback, but none should now be used for monitoring. Max SPL at 1.5m: 104dB(A). Will become obsolete when repair stocks of drive units are exhausted.

The following units were used:

— Spendor 8-inch Bextrene cone woofer
— Son Audax HD12x9D25, 25mm fabric dome tweeter

The amplifier (AM8/15) is a modified Quad 303 where one channel drives the lf and one the hf, by the use of an electronic frequency-splitting and equalising network.