

DR128 at Sunderland Stadium of Light

To fully explain the significance of the new Sunderland Stadium of Light to the soccer-loving population of Sunderland, England, we should take you back a few months. In spring 1997 the outlook was rather different.



To say that everyone in Sunderland is passionate about soccer would be a difficult statement to disprove. To say that there is some rivalry between Sunderland and neighbours Newcastle would be like saying that Mike Tyson likes a good debate. So when Sunderland were relegated at the end of last season out of English soccer's elite division while Newcastle were competing for the championship, the mood in the city was, well, downbeat.

Visit the city and its new stadium now and you get the feeling that a revolution is taking place. The team are riding high and should be back with the big boys this autumn (they even harbour justifiable hopes of Newcastle getting relegated!). When that happens, the team and its city have a showcase stadium that will match the best in Europe.

The revolution has, it could be argued, been fuelled by the solidifying effect of the new stadium - a statement of intent. The fact that this is the home of one of the best sounding stadium systems in the world can be no coincidence. The audio system is used very cleverly during pre-match preparations to whip the crowd (which frequently approximates the capacity 41,000) into a frenzy of anticipation and self-belief which seems to be transferred to the team. Before each game Prokofiev's stirring anthems are pumped through the system. During the game, the music reflects what is happening on-pitch with Queen's 'We Will Rock You' being the response to any opposing team bold enough to threaten the Sunderland goalmouth. Stadium sound, like soccer, needs a future. The precedent set at the Sunderland Stadium of Light might just be it ■

Aiming High



When initial discussions took place between the Directors of the club and sound contractors Network CDI, the brief was, to

say the least, conservative. The frequency range of the required PA system was stated as 350Hz to 4.3kHz. However, rather than settle for the basic requirement and guarantee a successful tender, Network CDI spotted an opportunity to push the envelope of accepted technology, even if it did mean jeopardising their further involvement in the project.

Continued

Co-owner of Network CDI and technical expert David Milligan explained to the board that the system currently specified would sound rather like 'Dial-a-Disk' telephone music whereas a properly specified sound system would be more in keeping with the stadium's 'showcase' architectural splendour and enable more options in terms of other forms of entertainment (read revenue!). His bold proposal was accepted, more money was allocated and the team got to work ■

The System

The sound system at the Sunderland Stadium of Light can be roughly divided into two areas - the concourses and the canopy. The canopy is a massive cantilivered roof which covers every single seat in the stadium and forms an unbroken symmetrical rectangle. Standing on the pitch, the height and scale of the canopy are quite inspiring and it is with some admiration that we listened to Milligan explain how he had to personally inch his way along the roof of the structure to mark out the positions for the speakers! The canopy system is divided into six areas and driven from six outputs of the Allen & Heath DR128 digital installation mixer.



Stand	DR128 Outputs
West	1
North	2
East	3
South	4-6

The system itself consists of 36 JBL 9042 AP speakers suspended from the underside of the canopy around its perimeter. This gives the best coverage without being visually obtrusive. The North, West and East stands are each fed with an identical mix from each speaker. However, the speakers covering the South Stand are sub-divided into three groups so that the sound coverage can be adjusted depending on the number of supporters following the visiting team. This allows announcements which apply solely to the visiting supporters to be targeted to precise seating areas of the stadium.

As is often the case, the set up of the system acoustics presented some problems, and the ease and power of the DR128 came to the fore in presenting easy adjustment after the initial installation was complete. Spectrum analysis was first carried out on an empty stadium and the EQ's on the DR128's were accordingly set up for best speech intelligibility. However, the acoustics changed dramatically when the stadium was full and so some 'fine tuning' of EQ settings had to be carried out by Milligan using the DR128's WinDR Windows control software. Milligan was delighted at how quick and easy it was to adjust the sound and to then duplicate a successful setting achieved on one channel onto all the other channels ■

The Route to Success

The DR128 forms one crucial part of a sophisticated audio installation. Other critical elements include a computer controlled digital audio routing system which feeds announcements and music to the concourses and to inputs 1-6 on the DR128. The music and DJ announcements originate in a small booth in the south stand and are routed from an Allen & Heath GL2000 mixer into the computer system. They are then transmitted using AES/EBU interfaces to the required areas of the concourses, including the executive boxes. Feeds for the North, South, East and West stands are fed from the computer system in analogue format to the DR128 inputs 1-6 where they are then EQ'd and fed to the canopies. The DR128 inputs are thus configured as shown below:

DR128 input	Source	Destination
1	DJ/Announcer via computer system	West Stand (Zone 1)
2	"	North Stand (Zone 2)
3	"	East Stand (Zone 3)
4	"	South Stand #1 (Zone 4)
5	"	South Stand #2 (Zone 5)
6	"	South Stand #3 (Zone 6)
7	Direct feed from DJ's GL2000	All stands (Zones 1-6)

Input 7 from the DR128 is routed direct from the GL2000 in the DJ booth and is routed to all zones. This is useful as a fail-safe or for other types of entertainment in the stadium ■

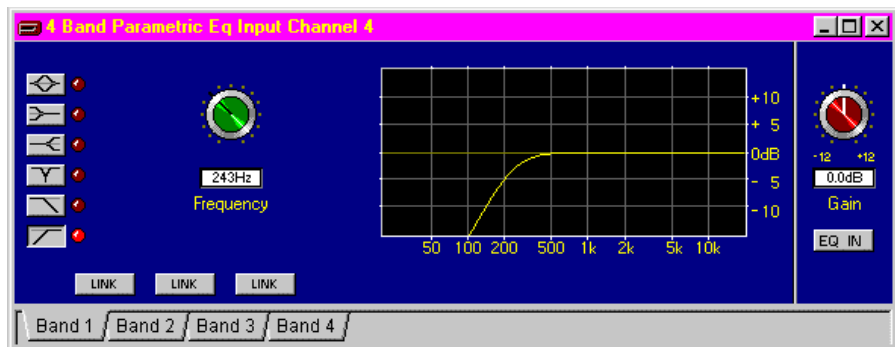
High Definition

The DR128 is used essentially as a zoner with EQ. As inputs 1-6 are fed from the computer system which contains the full spectrum of audio, these inputs each have a parametric EQ configured as a lo-cut filter. The cut-off frequency is around the 200Hz region as shown below:

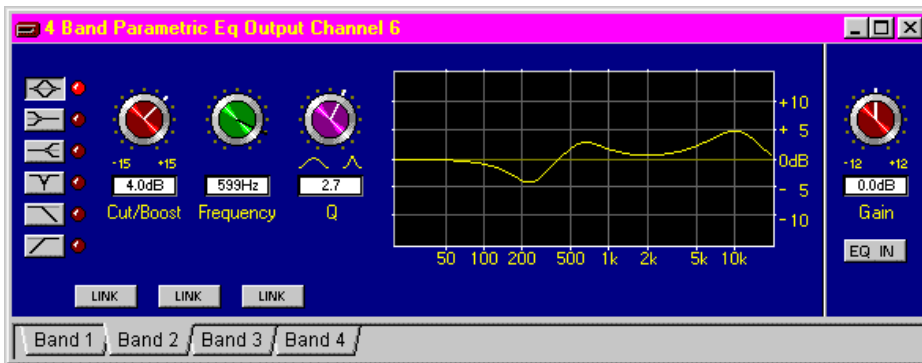
The reason for this is that one of the biggest aids to speech intelligibility in this kind of environment is to remove any unnecessary bottom end. The settings described below were found to provide a satisfactory cleaning up of the bottom end without removing punch from

the music signal. Excessive bottom end on the speech signal can result in a highly undesirable 'standing wave' effect which muddies the sound and gives the all-too familiar muffled sound associated with a lot of stadium PA systems.

Channel 7, which is fed direct from the DJ's GL2000 does not have an EQ allocated as all necessary EQ can be carried out on the GL2000.



As for the six outputs used on the DR128, again a four band parametric EQ is employed on each signal. These EQ settings had to be fine tuned by Milligan during the course of the first six games or so to compensate for the impact of a crowd on the acoustics. The settings that he finally arrived at are as shown below and are identical for each channel:



The final element in the sound control provided by the DR128 is the output limiting. Each output limiter is set up with a -3dB threshold and a fast response. Milligan describes the system as

being able to handle anything that might be thrown at it, including a stadium rock concert. This was put firmly to the test on the opening night when Status Quo performed in the stadium to the delight of the locals.

The Allen & Heath involvement in the installation does not stop there, however. In the Sports Bar, which serves drinks, food and various forms of entertainment including satellite TV, pre-recorded and live music and table football, the sound system is controlled by an Allen & Heath GL2000. This console feeds clusters of JBL Control 20 speakers distributed throughout the bar and these are augmented by JBL sub-bass boxes for added punch ■

Conclusion

The sound system at the Sunderland Stadium of Light is one of the most impressive of its kind and, after listening to it, it is hard to resist the thought that this is the way forward. The power of the system and the effect that it has on the crowd seems to be one of major factors propelling the club to success on and off the field. When they are competing with the finest and wealthiest clubs in Europe, the message about the importance of creating a spectacle will be clear to all and many will want to follow the example set by this ambitious venture.

As for the audio system itself, it may be an unusually sophisticated and large-scale system, but lessons can be learnt and applied right down to a small restaurant or theatre. Create a mood and you get happy customers - which equals money. Compromise on the sound system and you will be left behind by more adventurous competitors.

The DR128 is an extremely useful tool with the flexibility to excel in a wide variety of applications. It gives you the control you need to be able to cope with multiple zones and unpredictable acoustics, it is very easy to set up and it is refreshingly economical in terms of space and cost compared to a rack full of mixers, equalisers and signal processing equipment ■



Allen & Heath
Kernick Industrial Estate
Penryn, Cornwall, England TR10 9LU
T +44 (0) 1326 372 070
F +44 (0) 1326 377097
Website: <http://www.allen-heath.com>

A Harman International Company