In the last quarter of 1998 my company Activated Space Pty Ltd installed a Richmond Sound Design AudioBox into the Immigration Museum (IMHAM), Flinders Street, Melbourne. This is the first AudioBox to be installed in Australia. As it is a piece of equipment that I am sure will be of interest and use to the electroacoustic community, I am providing here a brief review and a number of URL references.

The AudioBox DM1616HD is a 16 input, 16-output matrix mixer. It has programmable equalisation and delays on all inputs and outputs and has 8 channels of hard disk playback, which are fed into the input channels 9 to 16. Input channels 1 to 8 consist of eight synchronous channels of 20 bit analogue to digital conversion fed by female XLR at 15K ohms, accepting a signal as hot as +20 dbu. The outputs consist of 16 synchronous channels of 20 bit digital to analogue conversion fed to 16 male XLRs at 600 ohms, again running as hot as +20 dbu.

All inputs and outputs are provided with high audio quality electronically balanced line receivers and drivers. The AD, DA converters are 20 bit linear, fourth order delta-sigma, with a sampling frequency of 48 kHz. The stated frequency response is 20 Hz to 20 kHz plus or minus 0.1 db with a stated dynamic range of 102 db, unweighted across the above noted frequency response spectrum.

The programmable equalisation allows up to 12 bands of true parametric equalisation to be assigned to any input and any output with a centre frequency anywhere between 20 Hz and 20 kHz, a Q from 0.5 to 50, and a 20db cut or boost. There is processing power to accommodate a total of 96 bands of EQ across the entire box. The delays are programmable from 0 to 5.2 seconds in one one-hundredth of a frame increments, however the total delay assignable across the entire box at any one time is 5.2 seconds.

The AudioBox is equipped with control protocols for midi-in, midi-out, midi-through and SCSI.

You will see from the above specifications that the AudioBox is capable of delivering very sophisticated control of multi-channel sound dispersion. It is possible, using the 256 matrix cross-points to programme the movement of audio on a single input, across the 16 outputs over time with varying gain structures.

In my use of the AudioBox at the Immigration Museum (IMHAM - see www.activatedspace.com.au), I tried to establish unity gain setting for all inputs and outputs, approaching the setting of levels using the cross-points. The cross-points are individually programmable and may be faded over time, which, depending on speaker placements, causes an illusion of the physical movement of the sound source in the time domain. Use of programmable equalisation in synchronisation with the changing of gain structures will augment the sense of perspective.
The AudioBox is programmable using Midi Show Control. Midi Show Control developed, by Charlie Richmond, is a protocol extension, to the standard midi set.

Midi Show Control addresses sounds on the hard disk as clips. The clips are programmed into a path which is itself a part of a list. It is possible to have up to two lists open at any one time with any number of paths open and active within those two lists. It is therefore possible to have a great number of audio elements playing simultaneously with control only limited by the number of inputs and outputs available.

The show control cues are stored on the internal hard-disk providing virtually unlimited non-volatile show programming capacity. A show is the overall structure containing the programmed lists, paths and clips. A number of shows can exist on the AudioBox simultaneously, however, only one show can play at a time. A selected show is assigned as the default to be loaded when the AudioBox is turned on. Any show can be called up at any time using Midi Show Control commands.

The AudioBox can be programmed from a PC or Macintosh. The PC software ABedit (supplied with the box for free) presents a less user-friendly interface requiring the programmer to open parameter windows for each control input. The Macintosh software ABControl provides all parameters on a single interface (much like a mixing desk) with an added Cue list window with columns for each kind of control data. Clicking on the appropriate column opens the data edit window associated with that parameter. It is possible to draw speaker positions and dispersion angles within the Macintosh software, a function not available within the PC software.

Each of the gain structures established, as a cue within the AudioBox is stored as a preset. The programming therefore requires simply the recall of a gain preset number. A preset may be allocated a submaster control so that all gain structures with that preset can be increased or attenuated through the movement of the allocated submaster.

The programming and the dumping of audio files into the AudioBox, takes place over SCSI. Audio is prepared as mono AIFF files and is transferred using a software utility from either a PC or a Macintosh. The AIFF files must be at 48 kHz.

GAIN CONTROL

The AudioBox provides two forms of automated gain ramping, sub-mastering capability, muting and soloing, and downloadable gain curve tables. The two forms of gain ramps are exponential and table driven and may be selected as part of the programmable gain command. The duration of the gain ramp is adjustable from a few milliseconds up to one hour. The gain changes are always ramped at the DSP level on a per sample basis ensuring that the gain changes are artefact free.

Up to 32 submasters are available for live input and output level
control. Each sub master can be independently assigned up to 32 input and output points and each control point can have any number of submasters assigned to it. All of the programming functions of the AudioBox are driven by 4 synchronised DSP chips configured in a shared memory architecture, coordinated by a separate micro-controller running a real time multi-tasking operating system.

The programming command set for the AudioBox is contained in an on board EPROM. This means that firmware upgrades are possible from a host computer. The MIDI Show Control system is a little bit cryptic. For those of you unfamiliar with it, I recommend John Huntington's Control Systems for Live Entertainment, (Focal Press 1994).

I am sure when you have examined the URLs provided you will agree that the AudioBox is a very sophisticated and useful piece of equipment for electroacoustic music.

Some of you may have noticed that Darren Copeland has organised a touring concert of Canadian electroacoustic music in which he uses the AudioBox as the primary audio playback and sound dispersion system. He is using the Macintosh ABControl software, which allows real time changes of gain structures, EQ delay and dispersion assignments.

It is my hope that such a system would be available in a public (possibly outdoor) performance space in Melbourne within the next couple of years. It is certainly a project into which I have already put a good deal of energy and for which I continue to seek opportunities.

As stated at the beginning of this brief article, this is really only an overview. The intention is to alert those of you interested in sound dispersion and spatialisation to a useful tool, and provide some URL’s for further research.

It is worth noting that the AudioBox installed at IMHAM has been running daily from 8:00AM to 9:00PM since October 1998 without failure of any kind. The AudioBox is part of a much larger installation under the control of an Alcorn McBride V4+ show controller. You can find a system design schematic on my site at http://www.activatedspace.com.au

The AudioBox is available from Peter Jago at System Sound in Melbourne, Australia.

Other references:
Richmond Sound Design
http://www.show-control.com/abspecs.html

Third Monk Software
www3.bc.sympatico.ca/hfi/dm16.html

www3.bc.sympatico.ca/hfi/ABControl.html
Cheers,

Garth

Listen to some of the tracks from my latest CD at
http://www.activatedspace.com.au
See my MAP1 installation
http://www.activatedspace.com.au/Map1/map1.html (RealVideo)

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