ABSTRACT

The Sound & Media Studios @ Londonmet, Commercial Rd., were especially created for the BA Sound and Media, which started in October 2005 at the Sir John Cass Department of Art, Media and Design, London Metropolitan University. The BA, located within the Music area, focuses mainly on sound design for the media, especially video. Therefore, the studios needed both audio/video software and hardware. The distribution of the space was planned to allocate three 5.1 surround studios (mainly for audio recording and postproduction purposes), one recording space and three video-audio chambers with a 2.1 sound setting (mainly for video editing). The design of the whole complex was a cooperation project between the British firm ProMusic International, Javier Garavaglia (Course leader of the BA) and the development team for the course. The design is certainly unique in the UK (and probably in the world too) due to its original interconnectivity.

1. OVERVIEW

The development of the course began in 2003. The main idea was to incorporate media to the electronic treatment of sound, allowing creativity to be its most essential characteristic. The department had already a BSc course in audio electronics, so the new one should be able to recruit a different type of applicants. After preliminary discussions about what type of media should be involved, taking in consideration also other courses within the department and the possible share of modules with them, the decision relied upon focusing on sound design mainly for video. This early decision had a big impact in the way the studios were finally planned.

2. PLAN AND AIM OF THE STUDIOS

Once the academic planning for all three years of the BA was complete, the title and description of the course was quite clear. The sound design content should include not only sound creation and modification i.e. effects for film/video, video games, etc, but also music and even speech, as the 2nd Year offers alongside a video postproduction path, a broadcasting path as well. Moreover, a currently under development MA Sonic Art including electroacoustic composition should continue the academic curriculum in 2008, so that the Studios needed to be planned providing a professional environment for Postgraduate students too. PhD students in related areas should also benefit from the facilities.

In November 2004 the development of the studios did begin. It was clear from the start, that due to the type of facilities required, the ideal would be to contract a one-solution company, which would be in charge of the actual building of the chambers, their acoustic treatment and isolation, the procurement of the entire hardware and software components for the studios, as well as their installation and connection, including wiring for sound, network and hardware like computers and mixing desks. We were very fortunate indeed to be introduced to ProMusic International and its manager Paul Rayner-Brown. The company was able to plan with us the whole range of the facilities, covering 100% of our needs. The total cost was calculated against the budget already allocated for the facilities, which, including building works and equipment was around £500,000 (about US$1,000,000).

3. UNIQUE CONNECTIVITY

The complex consists of three 5.1 surround studios, three 2.1 video chambers and one recording space. The site was planned to be on the 6th floor of the Commercial Rd. building, replacing labs and classrooms.

The uniqueness of the design relies in the way all these chambers communicate with each other. The three surround studios and the recording room share a common square space, so that, after minor modifications to the old site (taking a whole wall down), an almost equal division of the square space in four parts was possible. This allowed planning the space in such a way, that two studios would be facing the recording room directly (studios 1 and 3, please refer to Fig. 1). The remaining studio (No. 2) would not have visual contact.
but this was enabled through the CCTV already planned for the complex. This allows, given the case, to use all three studios with different groups of students at the same time during the same session each of them acting as a different control room if necessary.

However, these three chambers can also be used as “stand-alone” studios for postproduction purposes, (film-video/sound or sound alone). The construction allows all studios to be working together without sound interference among each other, due to the acoustic isolation specially designed for the whole complex. In this respect, and to avoid adding unnecessary costs, it was decided that only the three surround studios would be acoustically isolated and treated, whereas the 2.1 video chambers should only be acoustically treated. These are not on the same site as the main studios, but across the hallway. Fig. 1 shows the whole complex.

Another unique feature regarding the flexibility of usage is, that even the surround studios themselves can be used as another recording space if needed, as the whole equipment is installed in a way that it can be completely removed within 30-45 minutes, leaving the room empty.

Moreover, the kind of construction allows the chamber to be fully dismounted and remounted in another location if needed, what makes it a very secure investment for the future. Besides, the whole complex is DDA compliant by design, giving complete access to all disabled persons.

All studios (including the video chambers but with the exception of the recording space) were provided with an Apple Macintosh G5 2.5 GHz Dual desktop. Each of them had attached an external 500 GB HD for students’ work. All computers are connected via a 1 Gbit Ethernet network among all six computers and an Apple XServer with a capacity of 4.8 TB warranties that, there should always be enough storage capacity in the system, as well as enough speed for data transfer. The network is in itself isolated and students cannot reach the Internet from the studios. However, the server is connected to the whole Londonmet network, which does have external access as a simple “hand-shake” to comply with regulations and to give to the system’s administrator access to the Internet for purposes like upgrading software, etc..

4. ACOUSTIC TREATMENT

The surround acoustic design included the control of primary and secondary fundamental resonances of both the building and chambers by multiple tuned Helmholtz tubes, purposefully built into the decoupled floor structures. This thoroughness at the design stage eliminated the need for additional traps or secondary surface treatments. Each chamber therefore needed to be totally isolated from the building and its neighbours and fully enclosed by its own structure including a decoupled floating floor and a self supporting decoupled mass loaded ceiling. Each component was carefully designed to absorb the main resonant frequencies by fully decoupling the frame, panel and damping components from each other and from the chamber structure as a complete assembly. They were further tuned to ensure maximum absorption efficiency from inter-chamber contamination. All this was needed due to a substantial exterior noise component from external sources (Commercial Rd.) and also because multiple adjacent studios necessitate acoustic absorption and isolation.

4.1 Studio isolation chamber design.

Each audio studio chamber incorporated Pro Music’s unique four-part acoustic barrier system to give optimum acoustic isolation. Added to that, an internal acoustic treatment was designed to neutralise the acoustic balance, minimising reflection and diffraction. The design comprised the following elements:

4.1.1 Walls and wall frames.
The walls were made prior to installation on site in 2440 mm x 1220 mm sectional panel units. This includes four part barrier separation walls, provided by 1x 150 mm exterior wall, 1x 50 mm circular void, 1x 150 mm internal wall and 1x 25 mm aesthetic HF absorbent liner, giving a total wall thickness of 375mm. All frames of 100 mm x 50 mm high grain timber were clad with a double layer, high mass loaded acoustic gypsum board on both sides, set on a decoupled isobarrier fixing the frame and the acoustic separation of each panel. All were internally loaded with suspended 100 mm sound deadening mineral heavy fibre insulation.

All walls were set on floor isolator frames of 150 mm x 50 mm high grain timber set on 4 mm isobarrier floor silicon/rubber decoupling layer. All chambers were tested regarding their acoustic isolation, with a starting
pistol measured at 138 dB at source and B&K measuring equipment, measuring astonishing zero contamination in the adjacent chambers, even from multiple test firings.

4.1.2 Ceiling
Made of support joists of 250 mm x 50 mm high grain timber spaced at 400 mm, with centres set over wall support timbers. The interior surface was clad in a double layer, high mass loaded acoustic gypsum board, set on decoupled isobarrier fixings from joists, aiming to separate acoustically each panel. Voids of 240 mm were loaded with 200 mm sound deadening, mineral heavy fibre insulation. The exterior was clad with 18 mm of exterior plywood providing crawl surface for access to services in ceiling spaces and subroof areas. The total thickness of fixed ceiling was set to 300 mm. The internal ceiling was provided by a suspended frame-and-panel-units system with inset ducting panels and lighting panels as per air conditioning and lighting systems specification requirements.

4.1.3 Internal acoustic treatment.
The provision and installation of acoustic damping treatments to walls and ceiling areas to achieve a satisfactory acoustic balance included proprietary bass traps, MF diffusion and HF absorption panels mounted on movable décor panels, set to optimise a neutral sound balance. The live-room treatment included one pair of 1200 mm x 1200 mm movable acoustic screens on castors.

All three Surround studios and the live-room share the same construction techniques and also are quite identical in size. Figure N° 2 shows some of these features below for studio N° 1:

![Figure 2. Prototype of one of the Surround studios.](image)

4.1.4 Floor.
The surround studios and the live-room are all set on a floor suspension isobarrier acoustic isolation, with support joists of 50 mm x 50 mm. The floor surface made of a double layer 18mm exterior grade WBP plywood with 50 mm overlap screwed joists with a 3 mm isobarrier acoustiflex roll matting between layers. The surface was covered with an industrial grade carpet tile. The floor extremities were vertically isolated by about 12 mm from the walls by an isobarrier acoustic matting layer. There are also 50 mm isobarrier mineral heavy-fiber insulation-in-fills between joists.

A peculiar characteristic is that the demountable wall/floor trim system enables rapid and complete servicing or modification of the electrical, audio and data wiring systems without unnecessary destruction or expense.

4.1.5 Doorways.
The sliding doors to access the surround studios are double-glazed sets of 1830 mm x 1980 mm with double sided latch and scailer lock mechanism.

4.1.6 Air conditioning.
The air conditioning system has a separate fresh air pumped supply to all areas, essential in acoustically sealed studios, not only for the health and safety reasons, but also for the long life or all systems and devices.

5. EQUIPMENT

The equipment for the BA Sound and Media was carefully planned at the same stage as the studios were designed and the academic curriculum developed. It was decided, that the surround studios should all share the same configuration, to allow students to easily exchange their working area.

In order to be consistent with the already established labs in the same floor, the computer platform was fully based on Apple products. This already set what type of main software would be taught (see 5.2 below).

Both the studios and suites are connected via a 1GBit Hub/Server/Raid, enabling maximum flexibility for data-transfer purposes across the facility. Students can connect directly to the server or to any of the external drives from anywhere within the network, offering plenty of choices regarding where to work and/or retrieve information or back-ups, even by projects using 1098 high definition video and surround sound.

5.1 Audio/MIDI hardware:
• 6x Apple Macintosh Dual processor G5 computers, 2.5Ghz.
• 1x Apple Macintosh XServer and RAID with 4.8 TB storage and 1GBit Ethernet.
• 3x Yamaha DM2000 digital mixing consoles (surround studios only).
• 3x MOTU 828 mkII Audio and 3x MOTU MIDI Express 8 Interfaces (surround studios only).
• Genelec speakers and subwoofers (diverse models:
1032A, 8050A, 8030A, 7070A, 7060A, 7050A),

First Year – Autumn Semester:
Music Theory 1, Introductory Acoustics, Basic Principles of Audio Recording, Video for Sound practitioners.

First Year – Spring Semester:

Second Year – Autumn Semester:
Applied Technology 1 (sound based project), Digital Audio Systems, Video Postproduction design 1, Radio Production.

Second Year – Spring Semester:
Applied Technology 2 (sound based project), Sound Synthesis and MIDI, Video Postproduction design 2, Radio Drama, Digital Studio recording techniques.

Third Year – Autumn Semester:
Final Project Sound and Media 1 (double module), Dissertation (2 Semester module), Audio and Video streaming on the Web.

Third Year – Spring Semester:
Final Project Sound and Media 2 (double module), Dissertation (2 Semester module), Elective module.

7. CURRENT MEMBERS OF STAFF
Current members of staff:
Javier A. Garavaglia: Course Leader / Studio Director.
Alexander Wendt: Lecturer in Audio/Video technology.
Allan Seago: Senior lecturer in acoustics and electronic music studies
Suzan Altay: Technician and lecturer.
Gareth Davies: Technician.
Christina Paine: Lecturer

8. ACKNOWLEDGMENTS
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1 Modules in italics are core (compulsory). All others are designate or elective.
2 The following people made the project possible, who I want to thank: Pro Music International Ltd. Crew: Paul Rayner Brown-Managing Director, designer/project director, Ross Rayner Brown-project manager, Karn Broad-project software and data manager, John Taylor, Max Wood, Ian Williams-site construction, Terry Wood - interior construction, Alan Collins-project electrician, Steve Giles-Air Conditioning installation, Julie Rayner Brown-project administration.
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