RA THE BOOK

THE RECORDING ARCHITECTURE BOOK OF STUDIO DESIGN

RA: THE BOOK
The Recording Architecture Book of Studio Design
www.ra-thebook.com

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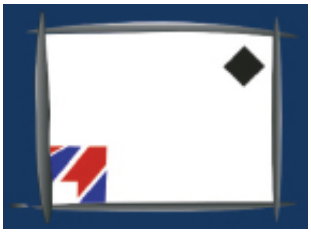

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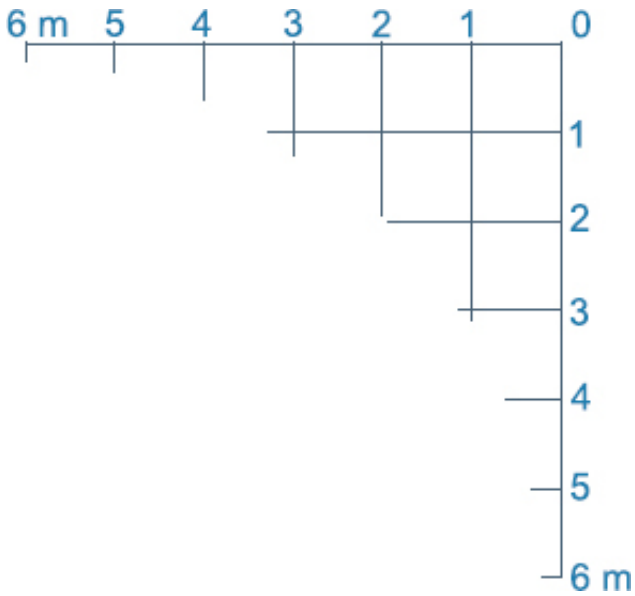
Gallery and plans 1987-1992

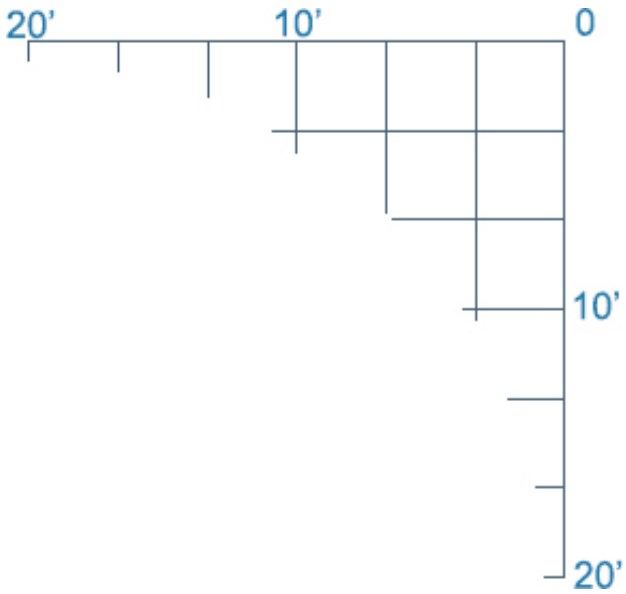
1987
1992
APS Abbey Road Ace Records Adlabs Albert Productions Thierry Allard
The American College In London Amplisound Dev Anand Ian Anderson
Angel Studios Angellsound Mark Angelo Studios Angelshare **The Aquarium**
Artezium Rick Astley Astoria Aurora B&B Burbank The BBC Babajim
Backstage Studios Russ Ballard Balea Music Martin Barre **Battery Studios**
Beechpark Beethoven Street Ned Bigham Black Rock Blue Post Bluechip
Bongo Post + Music Boogie Park Brahma Kumaris British Aerospace
Terry Britten Brixton Academy Rose Bruford College Brunei Royal Palaces
Bullfrog CTS Canon Audio Paul Carrack **Cavern** The Chemical Brothers
Neneh Cherry Cineom Vince Clarke Commercial Breaks CONEL The Core
Neil Costello Crazysound Cream Criterion Crystalphonic George Cuff
The Cure Cut & Run The Dairy Ray Davies De Lane Lea Derby University
The Digital Audio Co Digital Creations Digitalmix Dolphin Doncaster College
Double Trouble Le Doyen Bruce Dunlop Associates ECAM EMI Music
East Point Electronic Arts El Rom Eltham College Euphonix Evolutions
The Exchange **Exit Studios** Farasan The Farm The Farm Group Feltwave
Bryan Ferry Magnus Fiennes Fiesta Film Mix Film Labs Fluke Forwardbeat
Fullard Multimedia **Front Line Music** GIANT Pascal Gabriel Gaurav Digital
Noel Gallagher Ron Gariasco GearBox Geising Team Gemini Audio
Glenrothes College CGI Gloucester University Grange Farm David Gray
Great Linford Pavilion Ground Control H20 Steve Hackett Halwani Audio
Hammon Studios Harman UK Hackney Arts Centre Haringey Arts Council
Jeremy Healy Heathman`s Mastering Pete Heller Steve Hillage Rupert Hine
Hijodhamar Home Hum ICC INX TV Infogrames Izabelin Studios
JCA Jnanapravah The Joint Jungle Kash Productions The Kinopalace
Koh San **Konk Studios** Lenny Kravitz LMN London Weekend Television
The LSE Yusuf Lakdawala Lakeside Studios **Lansdowne** Annie Lennox
Lennox Lewis College The Levellers The Limehouse Liquidspillers Loco
London College of Music London Post Louis Lahav Loxley Post **Magmasters**
Manfred Mann Magneto Electric Works MANCAT **MCA Music** MIAM ITU
Maison Rouge Macasso Music Marmalade Martha's Studio Dru Masters
The Master Recording Company Matrix Maximum Music Jason Mayo
Media Tools Metrophonic Robert Miles **The Mill** Daniel Miller The Mix Room
The MixItPro Co Amar Mohile Momentum Monster Music Peter Moon
Trevor Morais Jacob Moreno Mosfilm Will Mowat Mustache **Mute Records**
NOB Navketan Shmuel Noifeld North Notts College Numb Productions
Gilbert O`Sullivan Billy Ocean Off the Wharf Optimum Oxford Digital
Orinoco Toyshop PEO Qatar Parrswood Philipp Palm Phoenixsound
Picture Production Company Planet Audio **Pluto Music** Polskie Radio
Michel Polnareff Polygram Hong Kong **Power Plant** Prime Focus The Priory
The Premises Die Prinzen Proper Records Pulse Recording Punkt Musik
Q Labs Rainmaker Post **Red Tape** RIP Records Rimon School of Music
Riverlight Roachford Rollover Studios Roller Productions Room4 Studios
The Roxy Rushes Freido Ruth SDL Sade Scramble Select Sound Sensible
Serious Rope Songphonic Sonoland Studios Sonologic Post Sound City
Sound Mastering South Thames College Speech Recording Street Studios
Studio 301 Studio One Spectral Harmony Square Centre Bernard Sumner
Tony Swain TMV TNT Hong Kong TVU Telegael Ten 21 Studios Terrarium
Phil Thornalley Michael Tibes Glen Tilbrook Tivoli Studios Trinity College Tuna
UB40 Uncle La Union Flamenco University of Wales Vox Populi Voice Tape
Walton & Stone Warchild Bosnia **The Waterboys** The Waterhouse Studios
The Welsh College of Music and Drama The Wembley Drum Centre Westpoint
Werner Studios Whistling Woods Whiterooms Pete Willis Steve Winwood
Ronnie Wood Worcester College The Workhouse Zaza Zoo Studios

The layouts featured in these sections have been generated using the original design

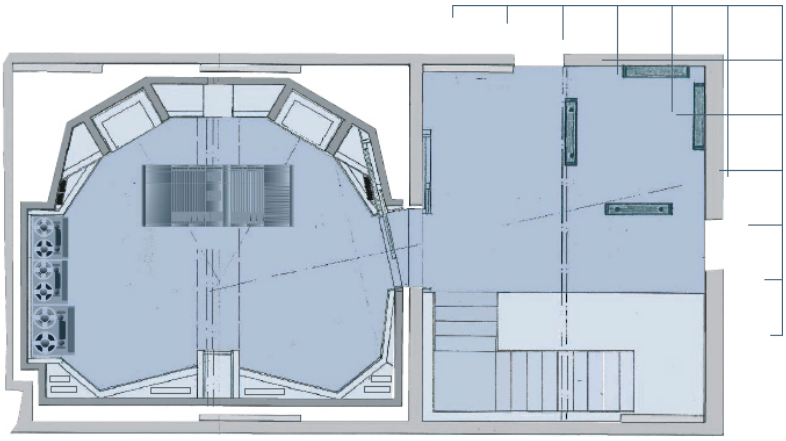
drawings and are formed from multiple layers of individual plans to more clearly illustrate the spaces. Until 2000, nearly all design and detail drawings were created using traditional Rotring pen and ink techniques on tracing paper. Thereafter, RA slowly introduced various CAD programmes including AutoCAD, Autocad Lite, CorelDRAW (for the majority of projects after 2000), Sketch Up and Autodesk Revit.



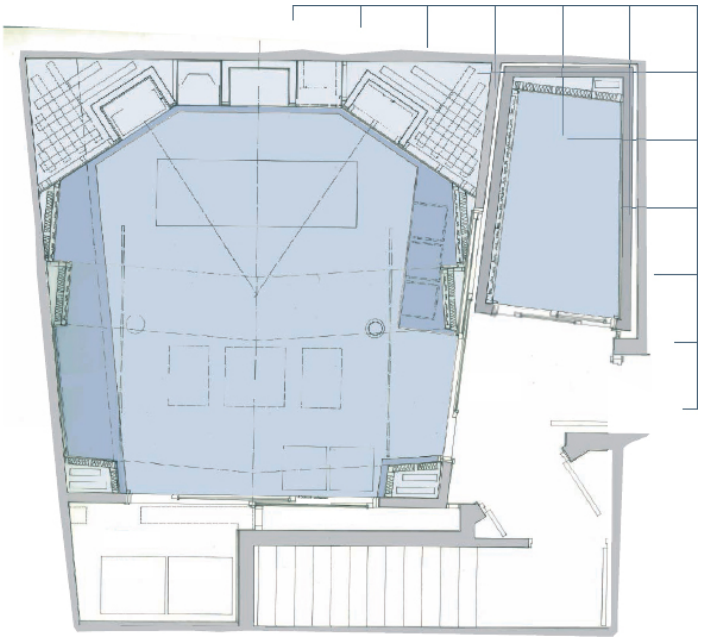
The scales of both these layouts and of the various source drawings vary enormously depending on the size of the project concerned. Consequently, to aid interpretation and to enable comparison between projects, a constant grid at 1 metre intervals has been superimposed on each plan (3 such 1 metre intervals being approximately equal to 10 feet). The thumbnail photographic images were all copied directly from the original RA website, www.aaa-design.com.

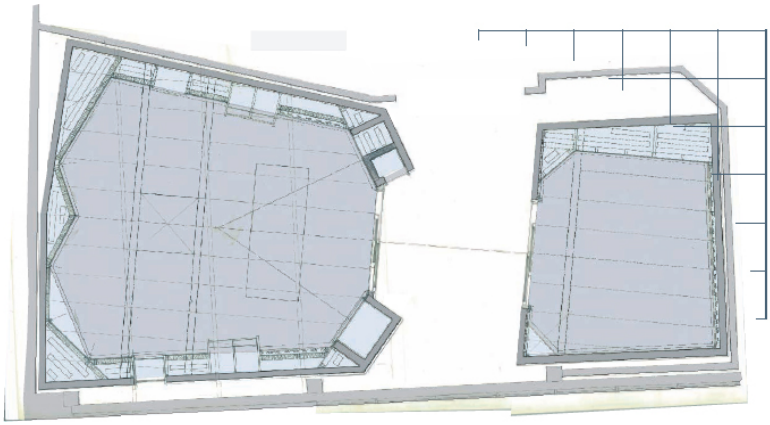


Hulgrave Hall (Pluto Music), Cheshire UK
Private music studio - control room

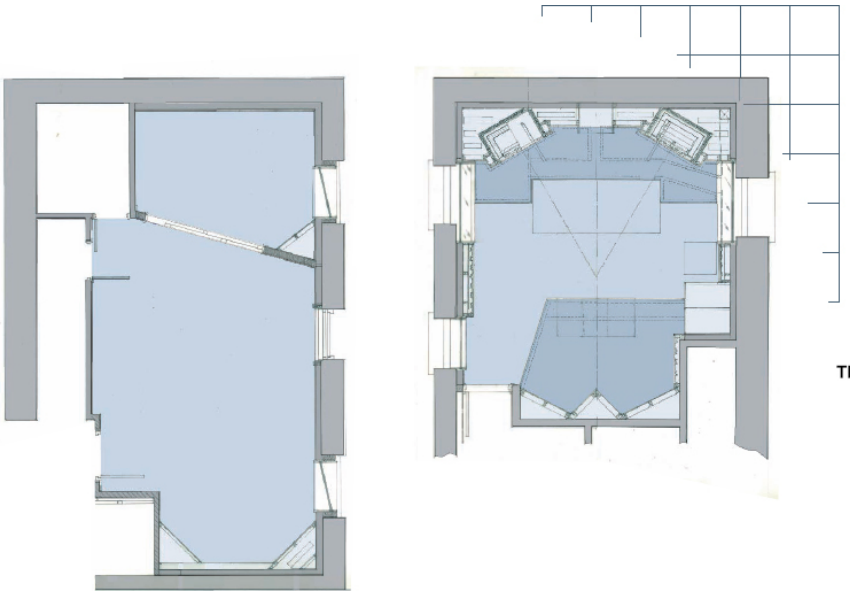


Battery Studios, London UK
Music studios - "The Lighthouse Suite" control room

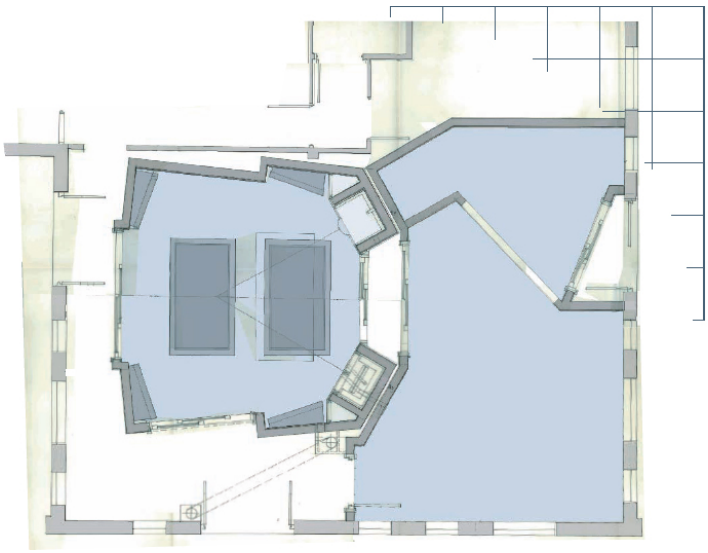


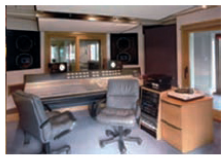


Mute Records, London UK
Record company HQ - music studio control room

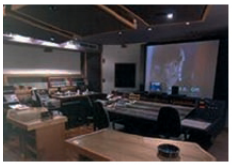


The Pavilion (Great Linford Manor), UK
Music studio - control room

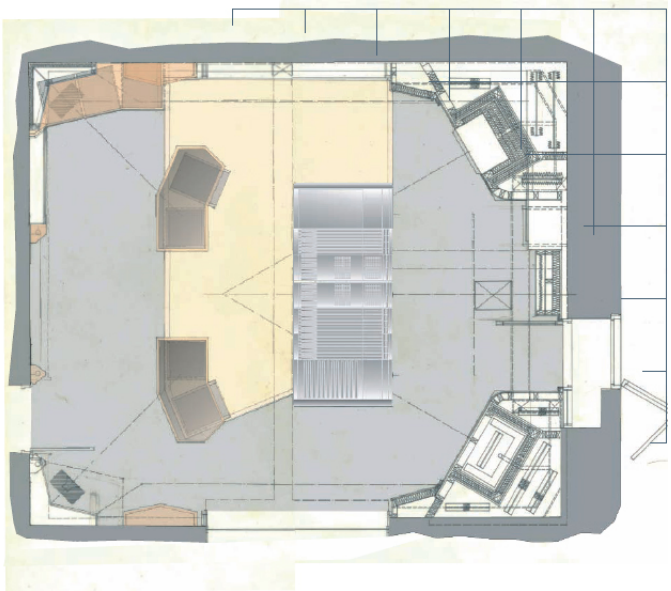




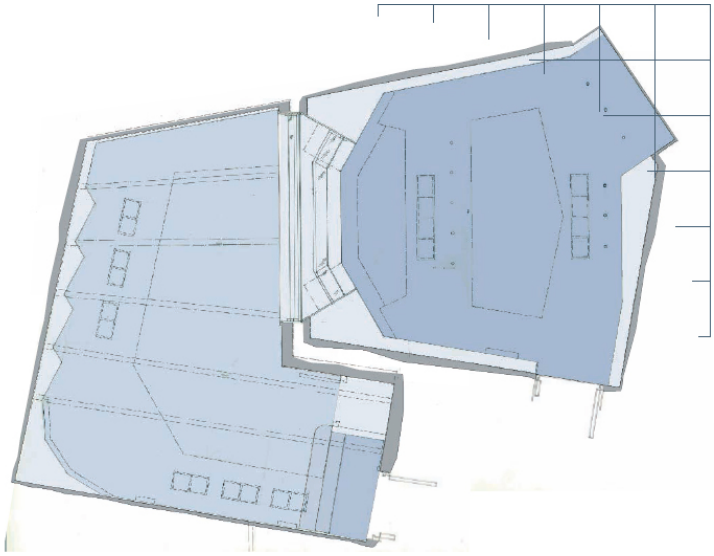
Parklands, Hampshire UK
Music studio - control room



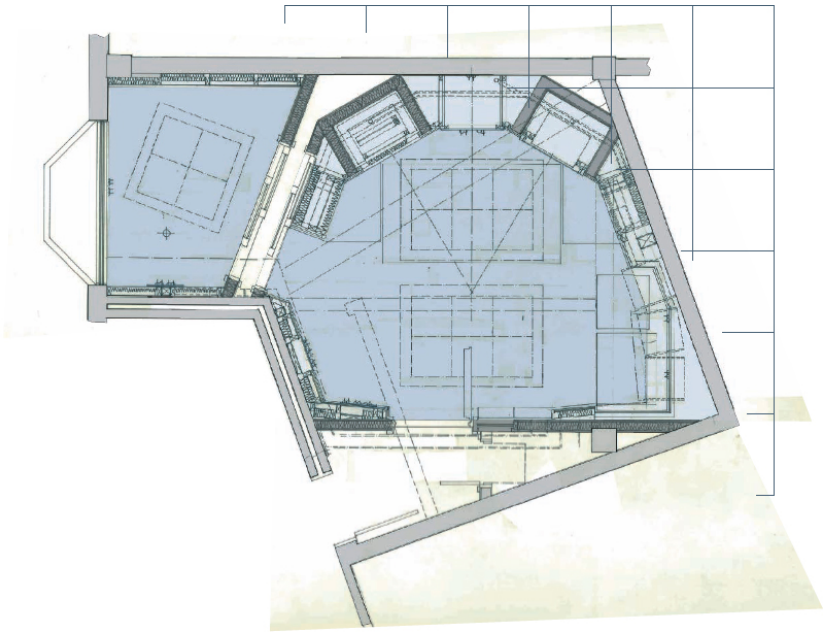
Lansdowne Studios, London UK
Music studios - main control room

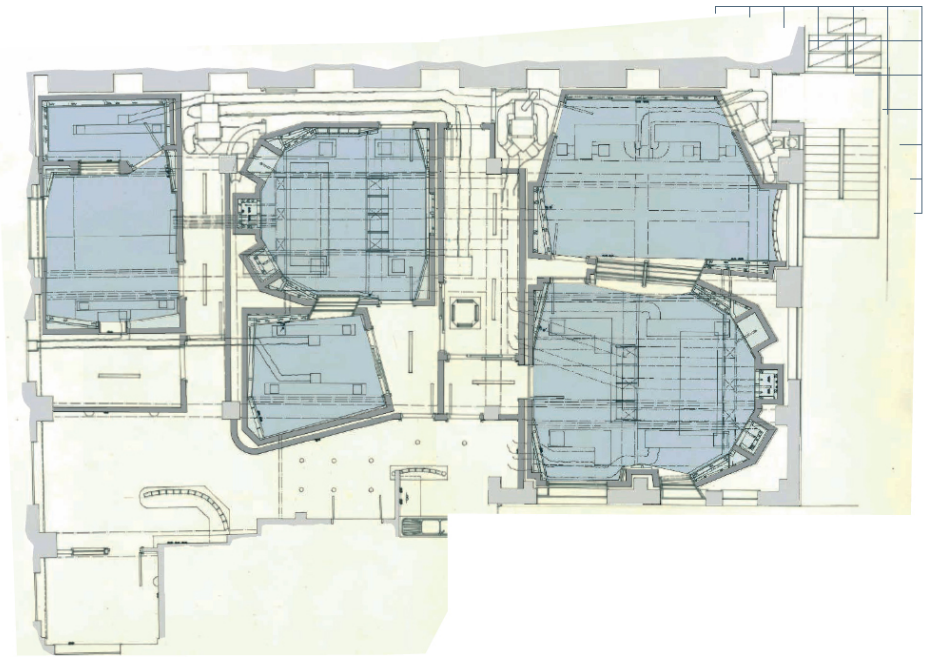


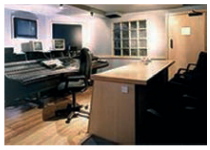
Power Plant Studios, London UK
Music studios - "The Jade Room" control room



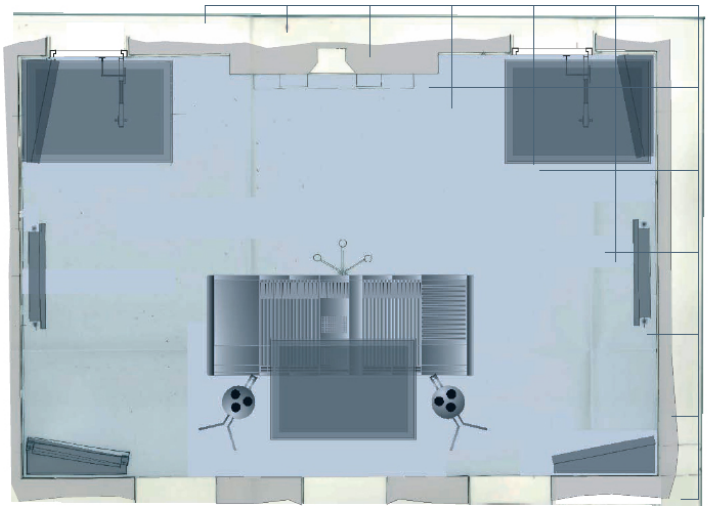
MCA Music, London UK
Music studio - control room



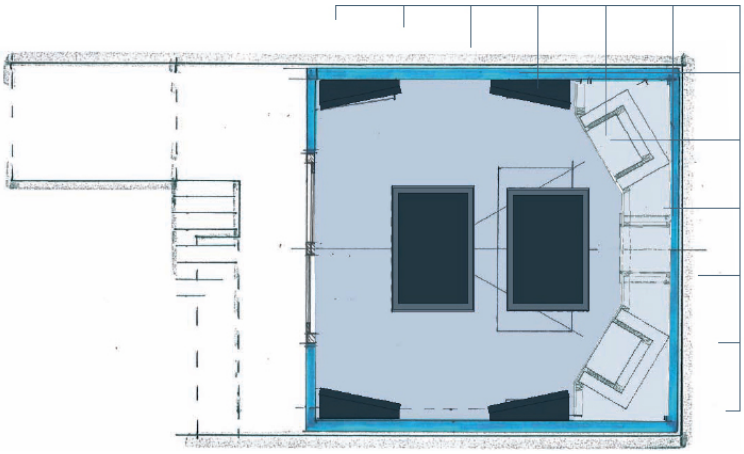


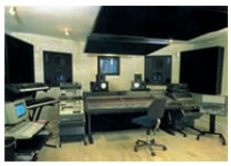


Magmasters, London UK
Post facility - control room II



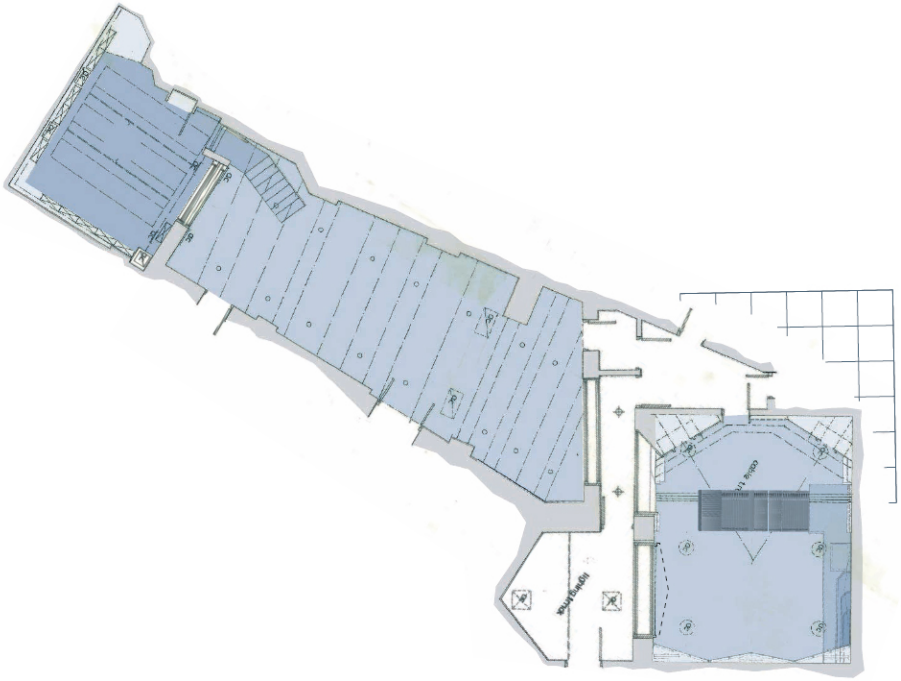
Spiddal Hall (The Waterboys), Galway EIRE
Country house project studio - main space



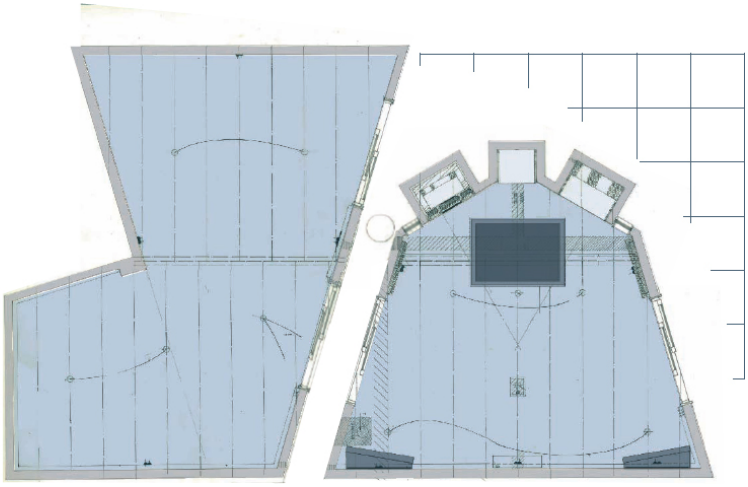


Noisegate, London UK
Private music studio - control room

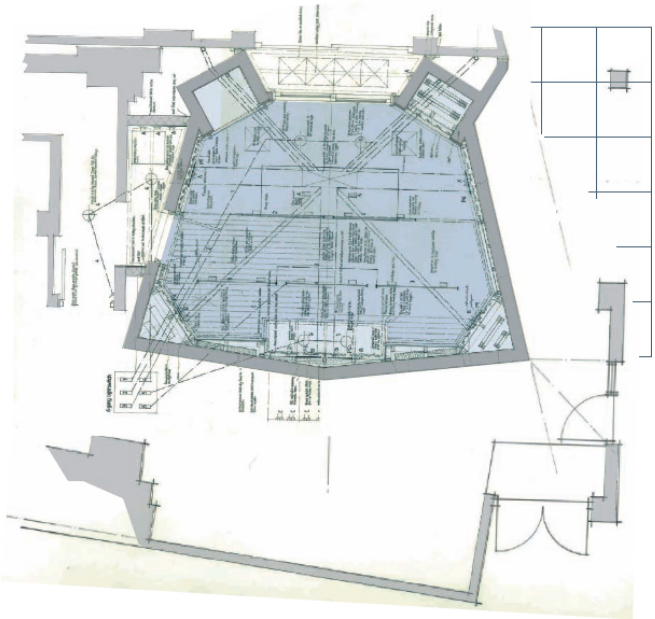
Konk Studios, London UK
Music studios - control room 1

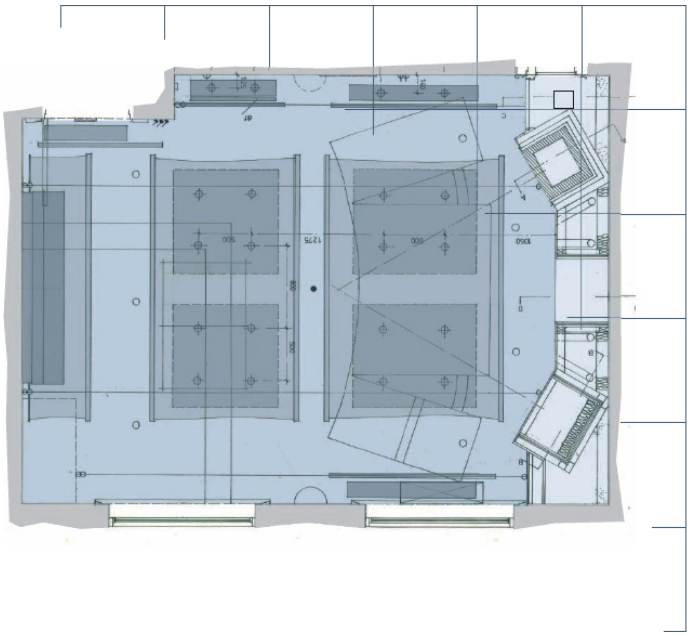


Cavern Studios, Amsterdam HOLLAND
Music studio - control room

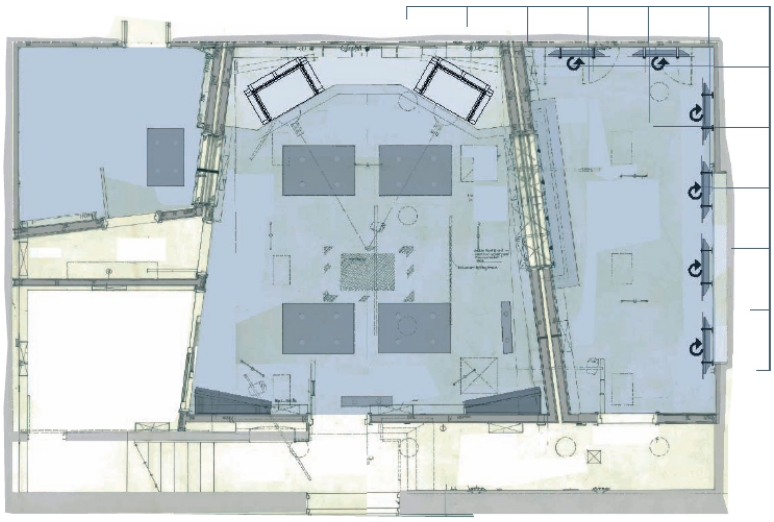


Red Tape, Sheffield UK
Community music studios - control room

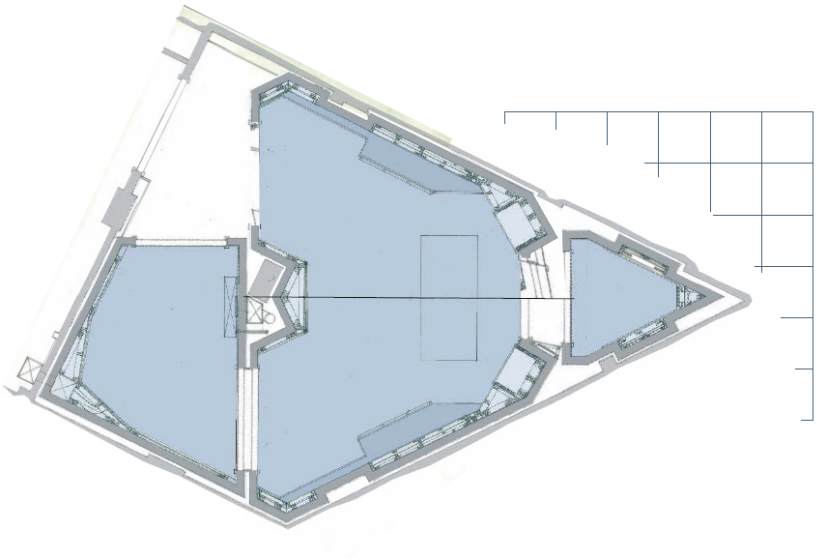




The Mill, London UK
Post facility - control room III



The Aquarium, London UK
Private music studio - control room



Exit Studios, Lisbon PORTUGAL
Music studio - reception area

Foreword by Adrian Kerridge

"*Jonathan (Miller, M-Y Books) is trying to persuade me to write a book too, encouraging perhaps, and I do intend to start sometime early next year. It might well be a tome since I joined the industry in 1954 at IBC when it was all very much in its infancy."*

The universal and everyday experience of sound:

Every day of our lives we are exposed to sound in our environment in one form or another, even before birth. Though we generally take sound for granted, we naturally become more aware of it when listening to music, whether live (at a concert or broadcast on radio or television), recorded (on cd, vinyl, or downloaded on our computers and iPods) or accompanying film (in cinemas or on dvd) and in television programmes and advertising.

The absolute need to record (or evaluate the recording process) in an acoustically controlled environment:

Recorded sound, particularly music entertainment, is almost universally available and in order to achieve the best possible results and for it to translate into such widely varying situations and formats, the recording engineer must record in a controlled environment. For those professionals reading this, that is taken for granted - if you are not hearing an accurate representation of what your music sounds like during recording, then there is little chance of producing a high quality end result. I have had the none too pleasant opportunity to record in a number of studios over the years where the acoustic-architecture has been appalling, where a controlled and balanced room frequency response did not exist and the client was not at all happy with the results - *"It doesn't sound like that when I play it at home, what did you do?"*

How many times have you heard someone remark: *"I went into this or that building/concert hall/room and it sounded odd when I spoke*" or "*I could not clearly*

hear the music/the speaker" or *"There was too much echo"* et cetera. The acoustic in which we hear sound has an enormous bearing. In concert halls and other large enclosed spaces not particularly well designed with acoustics for listening in mind, a common defect can be that of excessive reverberation - the slow decay of speech or music (a long reverberation time) due to the repeated reflections occurring at the hard, relatively smooth surfaces of walls, floors and ceilings before the energy is finally dissipated.

The need for a balanced approach to acoustic control and the avoidance of excessive high frequency absorption:

An extreme and unfortunately all too common solution would be to cover the all of the surfaces with sound absorbent materials but this can lead to over correction of the reverberation time, particularly at higher frequencies (frequencies vital for the harmonics which define the very timbre and quality of the sound) producing a deadening effect, most uncomfortable for performers (of both music and spoken word) and the listener. Many older studios and control rooms were treated thus by acoustic consultants with an outdated mind set.

Sabine and the beginnings of architectural-acoustic investigation:

As early as 1900, an American physicist (Wallace Clement Sabine, 1868-1919), became a pioneer in architectural acoustics, devising experiments to investigate the impact of absorption on reverberation time which he was ultimately able to formally define. Sabine's formula still helps define an important characteristic for gauging the acoustical quality of a room, providing the ability to predict how "wet" or "dry" a room is likely to be.

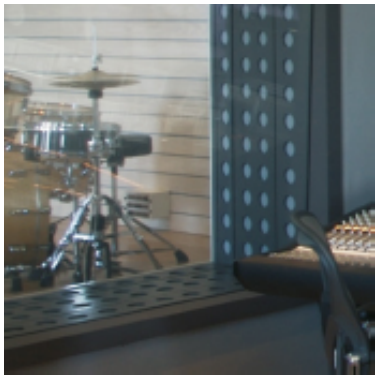
Sabine derived an expression for the duration T (time) of the residual sound to decay below the audible intensity and laid down three simple rules which must be followed if satisfactory results are to be obtained. 1) The sound heard must be loud enough. 2) The quality of the sound must remain unaltered - that is to say the relative intensities of the components must be preserved. 3) The successive sounds of speech or music must remain distinct. i.e. there must be no confusion due to overlapping of syllables - whether sung or spoken. These are basic principles which hold good today. The first

auditorium designed by Sabine, applying his new knowledge in acoustic architecture, was the new Boston Music Hall (Symphony Hall), formally opened on October 15, 1900 and still considered one of the finest concert halls in the world.

Thus a new branch of physics, architectural-acoustics was born. It was on the 29th of October 1898, at Harvard University, that he established the precise nature of the relationship between these quantities and placed the subject on a scientific footing long before the invention of the recording studio and the new breed of architects and designers that was to emerge into a new world of "recording architecture".

The Precedence Effect, the control of standing waves and the importance of other acoustic parameters:

Reverberation time is no longer considered to be the only acoustic parameter that must be addressed in a recording studio. It is vital to consider the Precedence Effect, the psycho-acoustic phenomen RQ whereby the brain fails to separately distinguish a reflected sound arriving within a few milliseconds of the direct sound (for example from the monitor speaker in a control room) effectively perceiving a single and misleadingly enhanced sound. The best control rooms I have ever worked in are those in which the sound arriving at the ear is not coloured by the room or by multiple standing waves (by the monitoring system itself, which must deliver a faithful reproduction of the original instrument/s). Achieving such lack of colouration gives the engineer the chance to equalise the various sound components and to be creative in the final production without the worry of "*what will it sound like when I play it at home or in the car?"* The above, of course, holds equally good for post production mixing rooms for film and television.



The significance of wavelength variation over the audio spectrum:

The generally accepted frequency sound spectrum for audio is 20Hz to 20Khz, which in it's self poses a potential problem. The wavelength at 20Hz is a huge 17.2 metres and at 20Khz just 17.2 mm. For large halls, such long low frequency wavelengths may be easily accommodated, but not so in many recording studios. Especially in control rooms, the studio designer is often constrained by size and space limitations which generate complex and difficult design criteria. Mathematically, one could not

squeeze a pint into a quart pot. Primarily in the 70s, this was overcome by large amounts of deep absorption and bass trapping which engulfed a large part of the room - not at all satisfactory if space is at a premium – and created an unbalanced, overly deadened acoustic. The art of tuned and low frequency membrane absorption, pioneered at The BBC, appeared to be lost! The effective use of diffusion rarely made an appearance until the 90s.

The importance of combining architectural/acoustic disciplines in a coherent design strategy and the value of experience:

From architects not understanding the technical and acoustic needs of studios to acousticians not grasping the ergonomic and three dimensional practicalities of architectural space, I have met them all - architects caring only for abstract visual statements, acousticians preferring to bury their heads in data rather than looking and listening to what is actually going on and the builders grinning with a reassuring "*Don't worry, Guv', I've built studios before*."

The one designer I had previously encountered in my professional career who actually seemed to grasp the issues, (a career which started in the early years of this still relatively young industry), was acoustic-engineer/architect (and significantly, clarinettist), Sandy Brown. He was responsible for the original design of Lansdowne Studios where I cut my sound-engineering teeth with the likes of The Dave Clark Five, big band and jazz groups, and working alongside the legendary maverick, Joe Meek. I eventually acquired the studio in the 1980s. Decades later, RA too seemed to recognize the need to bring together the aesthetic, ergonomic and technical requirements of a recording studio into a single, cohesive architectural/acoustic design solution.

Jonathan Miller and the rise of Recording Architecture:

RA were first introduced to me in 1988 by a young engineer I had personally taken under my wing at CTS and Lansdowne, one Jonathan Miller. In those years, Studio 1 was invariably full with orchestral sessions for the great films of the era (Full Metal Jacket, Who Framed Roger Rabbit, numerous Bonds…..) but Studio 2, though a good large space, was tired and old and the control room acoustics were based on

outdated theories and techniques, as for many control rooms of the 80s. The spaces just did not work and were consequently empty most of the time and so, I invited RA to have a go – but just the control room. I liked what they had to say and the way they said it but I thought I'd let them prove themselves. I detected an underlying and solid understanding of acoustic principles and a good, practical architectural eye - but with a refreshing and innovative angle. The result was a resounding success. RA applied their recently developed Black Box technique, a prefabricated and bolt-on solution for all the key acoustic control elements. They effectively threw out all the old 70s treatment (that had never worked) which also had the effect of making the room considerably larger – a trick Roger (D'Arcy) and I successfully revisited several years later to squeeze a little more out of the main Studio 1.

Onwards and upwards to Lansdowne:

Having "cut the mustard", I then let them loose on my flagship, Sandy Brown's landmark control room at Lansdowne, the real project. I had just acquired the fabulous sounding, disturbingly accurate and unflattering (but notoriously room sensitive) ATC soft-dome monitoring system for in 5.1 surround. The result achieved legendary status for Lansdowne yet again. The monitors were mounted on RA's signature mass-loaded, vibration-isolated plinths and separated from, though seemingly within, the damped non resonant front wall. With the architectural image of a modern and stylish gentleman's club (totally responsive and sympathetic to the 1930s Holland Park location), the room became considered amongst the best and most accurate of all the control rooms in London (if not the world).

And back again to CTS:

The next step seemed obvious. Following the success of Lansdowne, I immediately engaged RA to completely rebuild Studio 2 at CTS, including the large, semi-orchestral sized live hall. The result was dramatically different in architectural style and equally successful with giant sails straddling the studio ceiling and daylight pouring in through newly formed openings in the building fabric. Wonderful 1" thick oak floors spread out (thoroughly bonded to the thick floating concrete sub floors – a point Roger and I both absolutely insisted upon), and of course, there were "The Holes" – RA had only recently brought into play their take on diffusion/absorption

and its architectural expression. In the control room expanded into RAs preferred flared (but strictly symmetrical on-axis) trapezoid shape by eating into my valuable artists' restroom accommodation – the only fight we ever had. ATCs for 5.1 were again mounted in decoupled, mass-loaded manner. The result was another resounding success. When CTS finally closed its doors, the Black Box system from control room 3 that had been installed shortly after that of Studio 2, was reconfigured and augmented to create the control room at The Colosseum.

And finally, RA: The Book:

RA's approach to the various architectural-acoustic aspects of studio planning, design, and detailed constructional techniques are illustrated over the following pages. Nothing is left out and nothing is held back. It is a record of how acoustically successful studios have been, should be and can actually be built. As I said of RA at the time, "*Very professional, very professional….*"

Adrian Kerridge
Marlow, Buckinghamshire
2010.

Adrian with Mike Smith of The DC5 at Lansdowne in the 1960s

CTS Studio 1 with full orchestra in the 1980s pre RA's acoustic input

The Colosseum control room at Watford Town Hall in 2000

Brief biography

Adrian Kerridge, owner of the acclaimed Lansdowne Group of studios (Lansdowne/CTS) and a charismatic and often outspoken former chairman of The APRS (Association of Professional Recording Studios) and author of the foreword to RA:THE BOOK.

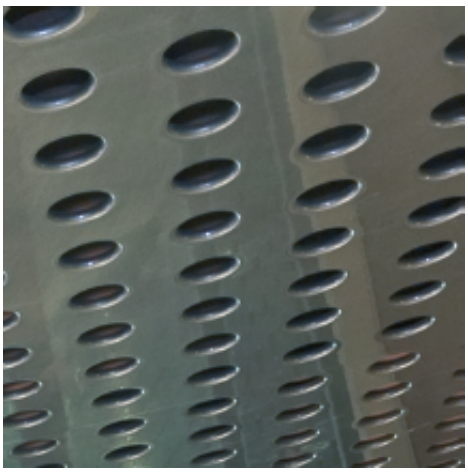
Adrian has been a key figure in the British recording scene since the 1950s, working alongside the legendary Joe Meek, engineering a key part of "The British Invasion" of the USA in the 1960s (The Dave Clark Five, Gene Pitney…….) and then acquiring Lansdowne Studios in 1980 with his business partner, renowned composer

and pianist, Johnny Pearson (ITN's "News at Ten", ABC's "Monday Night Football", "Sleepy Shores" and leader of The Top of The Pops Orchestra……..) and going on to redevelop CTS in the 1980s as a major film music recording facility ("Ghandi", "Four Weddings and a Funeral", Who Framed Roger Rabbit"…….).

Which is where RA came in, remodelling CTS Studio 2 in 1988 (before completely rebuilding it in 1995), and going on to remodel Lansdowne in 1989, CTS Studio 3 in 1992 and CTS Studio 1 in 1996, finally creating the control room for The Colosseum orchestral scoring hall in Watford in 2000.

During the course of writing the foreword for RA: The Book, Adrian received notification that he was to be made a Fellow of the Institute of Broadcast Sound – a thoroughly deserved acknowledgment of his achievements, stature and the respect with which he is held within the industry.

One of the first studios to be completed using RA:The Book as a guide: Twenty8, Athens Greece



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