

contact

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Electronic Music Studios in Britain - 2

University College, Cardiff

BEING SITUATED in a Physics Department is bound to influence the nature of any electronic music studio. The fact that it is possible to take an undergraduate degree in Physics and Music and a postgraduate diploma or M.A. courses in Electronic Sound at Cardiff inevitably leads to a more scientific approach to the use of equipment, an approach which has been noticeably absent in Britain until recently. Construction of the main studio was begun in 1971 after the award of a grant from the Leverhulme Trust, and it is now suitable for the production of four channel compositions.

Before 1971 computers had been used to generate sound for psychoacoustic experiments, so it was only natural that this aspect of synthesis should be developed. Music IVB was running on the large College computer as early as 1969, but the rudimentary conversion facilities led to its eventual abandonment. However, the PDP8 computers, which do have decent analogue-to-digital and digital-to-analogue converters, are still used for real-time concrete sound 'crunching' routines of different complexions, powerful extensions to the limited range of accurate analogue treatments available in the main studio and possessing more flexibility. The computers are also used for compositional organisation and voltage control, although this latter aspect has not been developed. For the most part the computers are used only for sound treatments impossible to obtain with analogue devices.

The main studio was designed for one man operation, with remote controls which enable all devices to be operated from one point. The mixer has any number of inputs to 18 channels, twelve switchable to six monitored groups with large, easily visible peak programme meters. (These are the most useful meters for audio work, as they measure the peak values of signals instead of the r.m.s. or, roughly speaking, the average intensity normally indicated by a VU meter.) All the usual treatments must be patched or switched, and in addition there are a number of mid-frequency boost units which insert a sharp notch of variable size in the frequency response. The whole unit was built in the department to complement the Synthi 100 synthesizer, so that the studio can be run in a number of different configurations simultaneously. The Synthi 100 has been modified a little, but no radical changes have been made. For example, the filter and oscillator amplitudes are now directly voltage controlled by the composer to make amplitude and frequency modulation spectra simple to control, and the sequencer now has another button to provide single clock pulses, useful for inserting predetermined event timings into the memory.

The second studio has a selection of specially built live performance equipment. The digital organ generates each note frequency from a single voltage controlled oscillator and also an envelope pulse either on each chord or each new note depending on the setting. Being voltage controlled, the whole keyboard output can be frequency modulated to produce complex timbres and textures. The mixer has eight channels useable in any configuration including six into two stereo outputs. There is also a range of special devices designed for specific events including voltage controls operated by feet, hands, light and other interfaces and also a range of microphones including minute contact microphones for instrumental use.

There is a sound recording studio linked to the other two, which is also used for preparation of performances by the Cardiff Composers Ensemble, which features tapes and live sound treatments in much of its work. A special aspect of musical research involves the employment of new devices to produce novel transformations of live instrumental sound with particular reference to the guitar and double bass. The main psychoacoustics project is a search for physical correlates of pitch using experiments on the perception of complex tones and stochastic signals. Another interesting field yielding fascinating results is the monaural localisation of sound, where spectral coloration causes apparent lateral elevation of the sound source. (As the external ear filters incoming sound according to its elevation, some illusions of source elevation can be created by deliberately filtering certain signals heard monaurally.)

The future looks bright for digital hardware, and already it is possible to build fast microprocessor systems for the real-time control of electronic sound in various coded forms. The most immediately attractive approach seems to be the use of Walsh functions, but possibly the more universal binary representation will yield a simpler system to control and understand. These possibilities are being looked into and simple devices are already operating. After the large computer programmes of the 60s this flexible 'small' technology

will inevitably change the shape of electronic music studios in the future. The special environment of the Cardiff studios will continue to contain a combination of music, physics and psychoacoustics so necessary to a composer of electronic music.

Cardiff Electronic Music Studio
Department of Physics
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Current Personnel

Lecturer and Director of the Studio: Keith Winter
Ph.D. students in electronic music: Mark Griffiths and John Schneider
Ph.D. student in electronics: Chris Newman
Also five students working to an M.A. in contemporary and electronic music and four on the postgraduate diploma course (two artists, one film-maker and one psychologist).

The members of the Psychoacoustics Group are as follows:

Lecturer: Philip Williams
Postdoctoral Research Assistant: Mike Greenhough
Tutorial Fellow: Jeff Bloom
Ph.D. student: Phillip Jones

A selection of works composed in the studio

Address enquiries for performance to the address above; we will then refer to the composer.

Brendan Barrie	<i>Missa</i>
John Exton	<i>Conversation Piece for Two Voices</i> (male and female) <i>Breathing Space</i> (four channel tape)
Martin Gellhorn	<i>Feedback with Filter Modulation</i> (1973; partly composed at York University Electronic Music Studio)
Mark Griffiths	<i>Environmental Studies</i> (1975; violin, piano and tape) <i>Bass Piece</i> (1975) <i>James Stephens Verses</i> (1975; ensemble, voices and tape)
Jonathan Harvey	<i>Inner Light (1)</i> (1972) <i>Inner Light (3)</i> (1975-76; orchestra and four channel tape)
John Schneider	<i>Dust</i> (1974; four channel tape) <i>Home Again</i> (1974) <i>Voyage</i> (1975; electric/acoustic guitar and tape) <i>Voyage II</i> (1976) <i>Voyage III</i> (in progress)
Finch Winter	<i>Rock and Roll</i> <i>Counting</i>
Keith Winter	<i>Time Flowers</i> (with Neil Ardley; jazz soloists, orchestra and tape) Tape for Gavin Bryars' <i>The Sinking of the Titanic</i> (1972) <i>Act without Words</i>

List of main studio equipment as at February 1976

18 channel mixer (six channel o/p), own design and construction
Portable eight channel mixer, own construction
Tannoy, KEF, Quad monitor speakers
Synthi 100 synthesizer with modifications
Two VCS 3 synthesizers
Teaching synthesizer, own construction
Digital organ with voltage control and pulse o/p, own construction
Three 12-bit A to D converters
Four 12-bit D to A converters
B & K Real time analyser
 3rd octave band pass filter set
 Sine/random generator
 Level recorder
 Frequency analyser
 Artificial ear
Spectrum shifter, Surrey Electronics
Grampion spring reverberation
25 channel 3rd octave graphic equaliser (40 dB per channel), own construction
Two PDP8 computers with 12 relay outputs
Dolby 'B' noise-reduction (4 channels)
Five Revox A77 tape recorders (3 high speed)
Revox G36 tape recorder
Magnetophone 28 two channel tape recorder
Studer A80 four channel tape recorder (one inch)
Teac four channel tape recorder
Thermionic FM eight channel tape recorder
Remote control for all tape recorders
Various amplifiers, pedal controls, signal generators, acoustic and contact microphones, headphones and test gear

This is the second of a series of articles designed to acquaint composers, technicians and other studio users as well as our general readers with current activities in electronic music studios. At present the series will be confined to those in Britain. Studio directors are invited to submit brief articles, following the layout displayed above, for inclusion in future issues. It must be stressed that only brief articles in the above format will be considered for publication, and that, since we only have space enough for one studio per issue, a waiting list may develop. The next studio to be featured will be that at the University of Durham.