

AUDIO RECORDING TECHNOLOGY IN THE UNITED KINGDOM.

A REPORT ON MY FINDINGS FROM A STUDY VISIT IN 1999.
(QUEEN ELIZABETH II TECHNICIANS' STUDY AWARD).

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ABSTRACT

This paper details the results of an investigative visit of nine recording sites in the U.K. Most of these are based in London, and all can be categorised as 'world class'. An account of a visit to the Solid State Logic factory is also included. General conclusions on recording technology and techniques are drawn, along with some comments on trends in the industry in the U.K. and the relevance to New Zealand.

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PART 1a RECORDING STUDIO VISITS

These are my findings from the studio visits. The sites I picked to visit can all be classed as major studios. The vast majority of their bookings are arranged by record companies, once a contract with an artist is signed. Results of the visits varied, depending on who showed me around, and how long I was allowed. Most visits had to be made during downtime (ie while no recording was taking place). While this prohibited observation of recording procedures, it did allow more time to check out what equipment was installed, and in some cases have a long chat with the Engineer.

Getting into studios in the UK was generally difficult. Less than 1/3 of those I e-mailed replied. Of those that did invite me, few would commit to a date. Usually the response was " get in contact with us once you are in the UK". So I did and then the response changed to "we might be able to fit you in next Wednesday, give us a call closer to the day". A lot of time was spent playing telephone tag and travelling (public transport in the UK is very time consuming).

I was pleased to make it to all but one of the sites I had contacted. Unfortunately I was unable to get to Westland Studio in Dublin. I would have been interested in that as it is an Eastlake Audio design. Their client list is international, but includes recording for the vibrant Irish music industry. The other disappointment was that after being turned down by e-mail, I finally got an invite to visit the legendary Abbey Road Studio (thanks to Rebecca Duncan). However it was too late for me to fit in. Maybe next time. I also missed out on seeing the Vintage Synthesiser Museum in Little Hadham as it is no longer open. A pity, as it was recommended by Bob Moog.

Townhouse Recording Studio

150 Goldhawk Road
Shepherds Bush

Date: 23.11.99

Host: Rebecca Duncan

Overview: The Townhouse is one of two studios owned by Virgin Records. It is situated in west London. This is Elton John's favourite recording studio. On the day I visited all of Studio 4 was fitted out with a Foley stage (false floor) to overdub the tap sounds for Riverdance. The Townhouse has eight mastering engineers. There are five maintenance engineers.

Studios: There are three studios in the complex (1,2 & 4!). Two of these have two isolation booths. The other has two rooms, one of which is very live.

Acoustics: Studio 1 has variable acoustics. The walls and ceiling have motorised poly-cylindrical panels. These are hemispherical with the back being absorbent, so that a rotation of 180° changes the panel from a reflector-

diffuser to an absorber. The acoustic design is by Sam Toyoshami who works for JVC in Japan.

Equipment:	Studio 1	Mixing console: SSL4000G (72channel) Monitors: Genelec 1035a Recorders: Studer A800 MkIII (2) Bosendorfer grand piano (with MIDI)
	Studio 2	Mixing console: SSL9072J (72channel) Monitors: PMC BB5XBD Recorders: Studer A800 MkIII (2) Steinway grand piano
	Studio 4	Mixing console: SSL4000E (72channel) Monitors: Genelec 1035a Recorders: Studer A800 MkIII (2) Bosendorfer grand piano (with MIDI)

Sarm West
8-10 Basing Street
London

Date: 29.11.99

Host: Henri. Although I has booked in nobody was expecting me on the day, so the tour was less explanatory than I would have liked.

Overview: Sarm has three studio complexes, one being a residential facility at Hookend. I visited Sarm West which is situated in West London. It is located in rather unpleasant location near the Portobello Road street market. Sarm is owned by Producer Trevor Horn. It is where George Michael records. Sarm West is mainly used by clients booking lockouts (having a studio 24 hours a day for the length of the project; often some weeks).

Studios: There are four studios in the complex . Studio 1 is large enough for a small orchestra, and has 3 large booths. Studio 2 is a medium size live room. Studio 3 was being refitted for Dolby 5.1 surround sound mixing and monitoring.

Equipment:	Studio 1	Mixing console: SSL 9080J Monitors: Allen Sides Recorders: Studer A827, Otari MTR90, Sony 3348
	Studio 2	Mixing console: SSL 4048E Monitors: Sean Davies Recorders: Studer A800, Otari MTR90, Sony 3348 Steinway grand piano
	Studio 3	Mixing console: SSL9072J Monitors: Quested Recorders: Otari MTR90 MkII , Sony 3348 Barco projection screen

Westside Recording Studios

10 Olaf Street
London

Date: 30.11.99

Hosts: Jacqui Attwood, John Earls

Overview: Westside is situated beside a film studio in a quite cul de sac in West London. I was able to speak with John Earls (Chief Engineer) about mixer design and industry trends.

Studios: There are two studios in the complex . Studio 1 is large (132m²). Studio 2 is large enough for a small orchestra.

Equipment:	Studio 1	Mixing console: Neve VR72 Monitors: Quested (4x12) Recorders: Studer A800 MkIII Bosendorfer grand piano (with MIDI)
	Studio 2	Mixing console: SSL 4048E Monitors: Quested (2x15) Recorders: Studer A800 MkIII Bosendorfer grand piano

Green Room Productions

The Laurels, New Park Road,
Harefield,
Middlesex

Date: 2.12.99

Host: Tony Faulkner

Overview: Green Room Productions is one of the major recording studios of classical music in the UK. They have recorded many famous orchestras and soloists, including 'our Kiri'. I attended a location recording session at Boxgrove Priory, near Chichester. This was an a capella recording of a recently discovered piece of 13th century music. It was performed by a quartet called Renaissance Polyphony. Boxgrove Priory has been used by Green Room Productions for more than 50 recordings. This is due to its excellent acoustics, and its location in the quiet countryside (many otherwise excellent rooms are now too close to modern noise sources).

Equipment: Mixer: Studer 10:2
Monitors: Quad Pro63 electrostatics
Recorders: Tascam DA-88 (2)
Microphones: Neuman TLM170

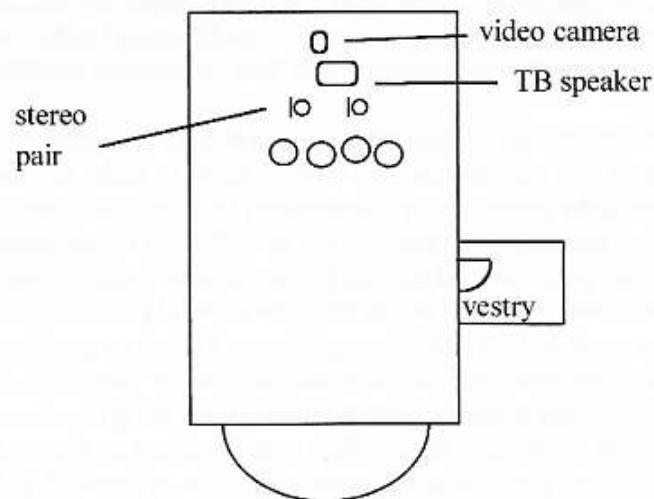
Session Details: The vestry was set up to be the control room. Because of the continued usage of the building for recording, a 'mouse hole' had been made in the door (complete with shutter). This enabled the engineer to record with the door shut, and thus talk to the Producer during recording. Closed circuit TV was used to monitor what was happening with the performers. A talkback speaker was setup to communicate with them from the control room. The other essential item was a large LPG heater.

The microphone setup was a matched pair of Neuman TLM170's spaced 60cm apart with a horizontal angle of 70°. The height was 3.2 metres from the floor. The polar pattern was set to wide cardioid. The recording was quad rate digital (176.4KHz) with a 24 bit word length. This was derived using a dCS 904 A-D converter. The signal was then sent to all eight tracks of the DA-88. This was paralleled with a second converter and DA-88 for redundancy.

The session proceeded smoothly once the singers emerged from the local pub. The only hiccup was during the soundcheck when a low level beeping was noticed. We traced it to the organ console and once the key was located, it was found to be the organist's alarm clock had gone off.

Unfortunately I had to leave before the session ended to catch a bus but I'm sure they managed without me. Once the right balance was struck

between direct sound and the reverb field the recording was quite straight forward (this was got by simply getting the singers the correct distance from the microphones- about 1.8m).



Real World Studios

Mill Lane,
Box,
Wiltshire.

Date: 8.12.99

Host: Owen Leech

Overview: Real World is the brainchild of musician Peter Gabriel. Although functioning as a commercial studio, the design brief was unusual. I would describe it as a super project-studio. The huge cost of setting it up is reflected in the rate (1,450 pounds per day). It is built in an old flour mill, with the control room being added. Several innovative ideas are included, such as a glass floor in the 'Stone Room' which is over a stream. The 'Big Room' features large windows for natural light and a view of the countryside. Real World has three full time assistants and three full time maintenance engineers.

Studios: Peter's private studio is situated in a separate building. It consists of a control room which consists of a U shaped setup of keyboards and outboard gear. Peter also has a vast store of equipment dating back to the days before Genesis and pulls the odd thing out occasionally. The day I

was there he has working on a project for the Millennium Dome. I met Dick, who has been personal engineer for Peter for 15 years.

The main commercial room is the Big Room which is large and has a performance area to the sides of the engineering area. The far-field monitors are on stands to get them close enough to the monitoring position at the mixing console.

The Production Room is a mixdown control room with a live recording room adjacent to it, called the Stone Room.

Beside the Stone Room is a large studio with a mezzanine floor, called the Wooden Room. There is also two pre-production rooms (the Bunker and Millside Studio), as well as a rehearsal room. Four studios in all.

Acoustics: The design of Real World was the result of an architectural competition and the ideas of Peter Gabriel with acoustician Neil Grant. The brief was to establish a natural performance environment while retaining the character of the 400 year old building. The separate studio and control room concept was discarded for one big recording-performance area. Careful thought went into ventilation, lighting, views, and acoustic surfaces, to make a recording space that was pleasant to perform and mix in. The story of how the design of the big room evolved makes great reading (eg the mixing console was originally planned to move back and forward on tracks). Large diffusers are suspended and the rear wall also has diffusers to scatter the sound in such a way as to not blur the sound from the monitors.

Equipment:

The Big Room	Mixing console: SSL4048G Monitors: Boxer Recorders: Studer A820 (2)
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The Production Room	Mixing console: SSL 4052E Monitors: Boxer Recorders: Studer A820
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An interesting point the maintenance engineer made about the A820 was it's speed accuracy was actually better in free run than in sync mode.

The Bunker	Mixing console: Mackie 8 buss (32 channels) Monitors: Yamaha NS10 Recorders: ADAT, ProTools III
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Millside Studio	Mixing console: AMEK Hendrix Recorders: ADAT (4)
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Peter's Studio	Mixing console: Sony Oxford
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This is an interesting mixing console. The name stems from the fact the a breakaway group of engineers at SSL (which originated in Oxford) went to work for Sony Professional. There are very few of these consoles. It is an expensive item, with such features as fully dynamic automation and motorised panning. The layout is quite different to the norm. It has 6 inbuilt CRT displays to show the status of the 96 channel strips. Between these and the channel strips are sections for physical control of auxiliaries, equalisation, and dynamics. The Oxford is a digital console and has a 7th display and automation control in the centre. The features of the mixer are very much set for mixdowns, as there is lots of automation. Only two channels can be controlled from the knobs.

Rehearsal Room Mixer: Soundcraft series 400B (24:8)

Strongroom Recording Studios

120 Curtain Road
London

Date: 30.11.99

Host: Nina Minstry

Overview: The most striking thing about Strongroom is the bright patterns painted on the walls (Jamie Reid design). There are four Engineers and one Mastering Engineer. A feature of the studio is the use of Coastal Acoustics Boxer series of monitors throughout. The complex also has an on site bar, where there is live music at weekends.

Studios: Studio 1 is a large live room. Studio 2 is used mainly for Dolby 5.1 mixdowns.

Equipment: Studio 1 Mixing console: Neve VR60
 Monitors: Boxer 5
 Recorders: Otari MTR90, RADAR
 Kawai grand piano

Studio 2 Mixing console: Euphonix CS3000M
An interesting feature of this console is the metering which is set into the front wall of the control room.
 Monitors: Boxer T5/T3
 Recorders: Otari MTR90, RADAR

Studio 3	Mixing console: SSL 4056G Monitors: Boxer 5 Recorders: Otari MTR90, RADAR
Studio 4	Mixing console: Mackie 8 buss (32 chan) Monitors: Boxer G3 Recorders: Otari MTR90, RADAR
Studio 5	Mixing console: Yamaha 03R Editing: ProTools

Orinoco
36 Leroy St
London

Date: 6.12.99

Hosts: Jon Dee

Overview: Hiding behind a solid metal door, Orinoco looks more like a fortress than a recording studio from the outside. Inside is the residential studio of the Chemical Brothers who travel to work here each day. Orinoco dabbled in video production at one stage and a 1600 square foot video stage remains that can be used for getting a very live recordings (good for drums).

Studios: There is one main studio (Neve Room), and a pre-production room, with booth (Toyshop).

Acoustics:

Equipment: Studio 1 Mixing console: Neve VR60
Monitors: Munro M4
Recorders: Otari MTR90, RADAR
Yamaha grand piano

Studio 2 Mixing console: DDA QMR
Monitors: Genelec 1031
Recorders: Otari RADAR

CTS
Engineers Way
Wembley
London

Date: 7.12.99

Hosts: Pat Dodd, Chris Dibble

Overview: CTS is the largest independent recording studio in the U.K. The facility includes one of the largest rooms in the U.K (80' x 56' x 30') with full film projection. The day I visited I was able to sit in on a filmscore recording. At the same time studio 3 was in use by the band who record the music for 'Last of the Summer Wine'. It is a big place, and quite busy. There is an in house restaurant capable of seating over 100 people, and parking for 100 cars. There is a sister facility (Lansdowne Studios) which was used by legendary Engineer Joe Meek. CTS has two in house Mastering Engineers.

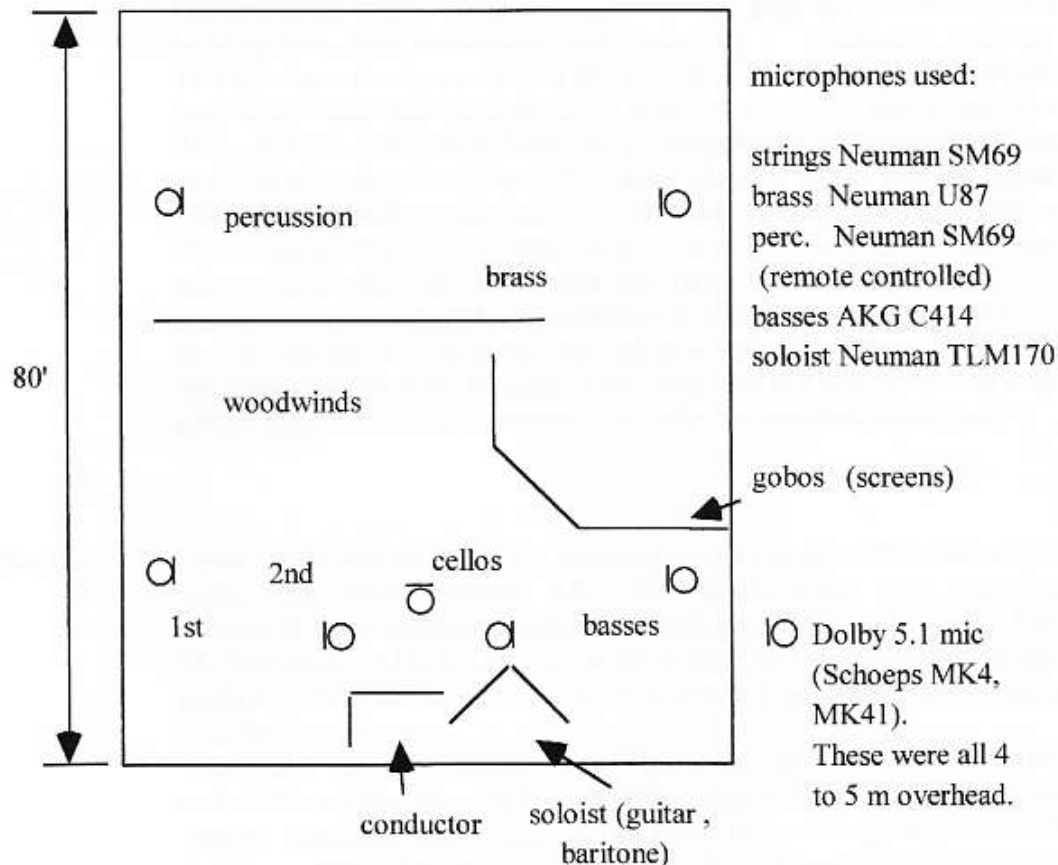
Studios: There is one main studio (Neve Room), and a pre-production room, with booth (Toyshop).

Equipment:	Studio 1	Mixing console: Neve VRP60 Monitors: SCM250, SCM20 (rear) Recorders: Studer A827 (2), Sony 3348 Fazioli grand piano
	Studio 2	Mixing console: AMS- Neve Capricorn Monitors: SCM200, SCM20 (rear) Recorders: Studer A827, D827, Sony 3348
	Studio 3	Mixing console: DDA AMR24 Monitors: SCM200 Recorders: Studer A827 Yamaha grand piano
	Mastering	Monitors: ATC SCM100a Editors: SADiE

Session Details:

The session was a post production filmscore recording for the movie 'Dads Day'. It involved a multi-mic. set up to record a 70 piece orchestra (London Philharmonic) with tenor (Placido Domingo). The take went to 34 tracks (2 synced Studer A827s). In the control room was the Engineer (Chris Dibble, Chief Engineer, CTS), one assistant (an intern) , one tape

operator, and one runner. There was also Steve, the composer/arranger, and a music editor (who oversees fitting the music to the picture). Out of sight in the studio was the conductor, linked to the control room with CCTV. The studio has three 35mm film projectors above the control room but for this session picture monitoring was done on a video screen. The studio set up was as follows:



At one point in the session the whole orchestra was playing and Placido Domingo singing and the sound out of the surround sound monitors was breathtaking. I had no sooner heard the take than I wished I could hear it again. Luckily the Music Editor spotted a tiny timing problem and a second take was performed. The clarity and power of that sound I won't forget in a long time. The quality of sound that can be achieved with good rooms, good mics, a good sounding console, good monitors, and exceptionally skilful technical and musical personnel is truly amazing. Sadly, only a small part of this sound will find its way to people in most picture theatres.

BBC
Broadcasting House
London

Date: 9.12.99

Host: Dave Chapman (Technical Training Officer)

Overview: The BBC proved to be no less than the fine old institution I expected. The history of the 'beeb' dates back to the first days of radio transmission with Marconi in the 1920s. Broadcasting House was built in 1932. Parts of the building have been modernised and connected to an adjacent high-rise. This has made the interior layout like a rabbit warren, where the corridors have five corners and three flights of stairs to get to the next room! The BBC approach has always been one of conservative professionalism and so I was interested to see how they were adapting to the modern world. They are actually quite active with new technology. In 1990 a Broadcasting Act was passed which made 25% of all productions independent, and this has forced the BBC to be competitive. New strategies have included the introduction of digital broadcasting, and BBC on-line. Alongside these initiatives with new technology there is no doubt that the old world BBC remains. Some trimming has been made since the golden days of wireless - there are now only two resident orchestras.

Studios: I was shown one of the G.P. (general purpose) studios. This had a SSL series 5000 mixing console, B&W 801 monitors and most recording formats (2 track analogue, multi-track analogue, DAT, CD-R, MD, DA-88, ProTools, SADiE). Old equipment is kept, so this control room was packed to fit it all in. The studio itself was not large but did contain a Steinway grand piano.

Next I saw the main control room. This is the nerve centre of the BBC and fulfils a function called 'continuities'. Basically all productions are cleared, timetabled and routed at this point before being transmitted. It involves a team of people monitoring signals and working on computers to generate the schedules for each radio and TV channel. Because the BBC is involved with sending and receiving worldwide, this is a big operation. The lines room where actual links are set up is a good size room full of racks of equipment. Dial up ISDN is used a lot now as it is a cheaper option than leasing landlines.

The BBC has a major project underway which is to transfer all old master tapes onto CD. As we went through the archiving room the CD on the top of the pile was 'Hey Joe' by Jimi Hendrix.

Located in the heart of the original building is the BBC radio hall which is still used for live broadcast. Still resplendent in its art deco decor it was easy to imagine that it might be fun to be in the audience seeing some radio play performed (on a wet London afternoon). The control room for the auditorium has full recording and mixing facilities (SSL 4000). There is also a suite for a sound effects operator to supply canned laughter etc.

The other studio I was in was a drama studio. This had Foley setups under the removable floor panels, and a dummy staircase that was half concrete and half wood. There was a Steinway grand piano and on top of it lay a telephone and several boxes to generate tones for different countries. I asked about the BBC Radiophonic Workshop, which was breaking ground in sound design from the 1960s-1980s. It is now all but gone with one person employed with a few samplers.

The BBC have several other studios in London, the main one being at Maida Vale where BBC television programmes are produced.

Equipment: Mixing consoles: The BBC commissioned SSL to make a special model (SSL 5000 series). An unusual feature is that these consoles have a slave (limited feature console). This is a dual control system where an announcer can mix to air from the slave after hours. During the day an engineer operates the full console in the control room. Apparently the dual control complexity took a lot of debugging and it was a costly exercise for SSL.

Editing: SADiE

Studer CD players are used. These are modified by the BBC to add several features such as a long-throw fader and large lit transport controls.

Much of the recording is still on analogue tape. This is preferred for reliability. MD is also used. Dave said they had experienced reliability problems with DAT.

PART 1b OTHER INDUSTRY SITE VISITS

Solid State Logic (SSL),
Begbroke,
Oxford.

Date: 3.12.99

Host: Dave Grinsted

Overview: Solid State Logic began business making electronic stop controls for pipe organs. From this they branched into large mixing console design and manufacture. The SSL factory is situated deep in the Oxfordshire countryside (close to Woodstock). I became aware of this as I followed a muck spreader up the lane to their premises. There are two buildings; the office and the factory. The office block has been decorated at some expense, and there are lovely grounds. The first thing I was shown was a new Avant digital console that was undergoing final testing. This was in the office block as it was too large to fit in the factory. It is 8m long and with 128 channels (512 inputs) is the biggest mixer in the world. The client is Sony Pictures (California). The console would be split into five sections for transportation. The console is actually only a control surface with the channel modules being quite shallow (approx 50mm). The mixer itself is housed in three 6' high 19" racks, and consists of two CPU units and a stack of multiplexed I/O units.

After this the SSL corporate hospitality extended to buying me a pub lunch at the Royal Sun. This was worthwhile as it gave me a chance to meet Ken Barrow who had been talking with the APRS (Assn of Professional Recording Studios - the UK equivalent of SPARS in the USA) regarding some form of training scheme under their manufacturer membership. Over Shepherds pie and a pint I got a bit of a feel for how industry training was seen in the UK. After this I was taken on a tour of the factory. The consoles are hand made to order. The frames therefore are assembled according to the size and configuration the client requires. The wiring looms are added, and the modules positioned. All the electronic sub-assemblies are manufactured at another plant. Once assembled the console is wheeled into a separate room for testing. Most of the testing is automated. The parts department runs 24 hours a day and has computer controlled carousels to bring the required parts bin to the picker (an SSL custom design). I also saw an SSL Scenaria which was a model designed for audio post but didn't gain the acceptance of the industry.

Back in the old building I was shown the demonstration rooms. There is a fully set up control room for each SSL model. The largest room housed a SL9000J and it is possible to test drive it recording to a Sony 3324 digital reel to reel. SSL run one week courses to familiarise purchasers with the mixing consoles. All in all a very professional setup. To date there are over 2500 SSL consoles sold. This is five times the number of rival company Neve.

Mixing consoles:

SL4000

75% of all US number 1 hit singles were recorded on an SL4000G+ (Billboard Magazine).

This mixer has been made to the same basic design since 1979.

Automation (Total Recall was added in 1981).

Current model is the SL4000G+SE.

Sting has a portable model (SL4064G+)

SL9000J

The analogue console for music introduced in 1994.

Dolby 7.1 option

Total Recall & Ultimatum standard

Axiom MT

Fully digital console for music.

Avant

A digital console for film post production audio.

Aysis Air

A digital broadcast console.

PART 2a COLLATION OF PART 1 INFORMATION

By having a brief look at a number of sites I was able to gather the following information:

Regarding choice of mixing console the SSL4000 is still popular. The SSL9000 is a good sounding console and several of the top studios have one, but fewer engineers know how to operate it. Euphonix consoles are not so popular. One reason is engineers preferring what they know (SSL and Neve). The other is the lack of product support. Not being a UK based company might have something to do with this. Most studios try to cater for all tastes by having at least two different consoles (models or brands). SSL are catering for client preference by manufacturing both analogue and digital consoles. Large format digital consoles have not taken off as quickly as in the USA. The issue is mainly economic, but other factors slowing acceptance are operational unfamiliarity, perceived unreliability and inferior sound quality. In some models the ergonomics of the control surface is also a drawback to functionality for music recording and mixing. This is less of an issue for TV and film post-production where the automation and reset capabilities make them invaluable. Analogue consoles therefore outnumber digital consoles by three or four to one. Apart from at the SSL factory the only digital consoles I saw were the Neve Capricorn at CTS, and the Sony Oxford at Realworld.

Analogue recording is still the preferred method (with 48 track digital available). In every case the studio provided analogue multitrack. Most also provided a digital alternative, either on a hard disk system or a reel to reel digital machine (usually a Sony 3324/48). The preferred hard disk recording system is the Otari RADAR. For editing the industry preference is SADiE. Less common was ProTools but it is tipped to gain wider acceptance. ADATs were conspicuous by their absence (I didn't see any).

Control room monitors varied with several studios using custom designs. Of the off the shelf makes Quested and Genelec were the most common. Near field monitors were often picked by the engineer or producer and included the usual NS10s, AR18s and 1029s.

Studio personnel numbers varied depending on the particular speciality of the studio. It is interesting to note that the number of maintenance engineers is often equal to the number of in-house recording engineers.

Dolby 5.1 control rooms are slowly becoming the norm but the format has not been readily accepted as in the USA. The UK attitude has been one of wait and see. There is some debate as to how to best fit out a control room for it (whether a retrofit of rear speakers in an existing design is adequate eg Townhouse, or a complete redesign is required, eg Sarm).

PART 2b SUMMARY OF THE BRITISH RECORDING INDUSTRY

The location of studios in London has moved over the years from a few record company studios in the north to a larger number of independent studios in the west. At the time of my visit there was talk of two new studios being built in south London. This might suggest a growing market but the people I spoke to were indicating the opposite. Having had a few good years where the large facilities were utilised (due to bands like Oasis, Blur), they were now counting the cost of upgrading to equipment such as the SL9000J console. Rates for these 'super rooms' seldom rises above 1000 pounds per day, a rate which has been static for the last few years. There is concern about studio utilisation as the current trend of techno dance music allows a lot recording work to bypass the big studios.

Studio work is tending to be more mixdown based. The reason for this is that amateur recording projects are being started at home or at smaller facilities. High tech equipment of hi fi standard is now available to the masses. This has seen the demise of the BBC radiophonic workshop and also BBC engineering design.

One solution is for studios to rent out production rooms. This was being done at the Townhouse which has five tenants. These are leased by freelance engineers or producers who want a personal studio, but also want to be close to the professional facilities that a large studio can offer. The studios with very large rooms, such as CTS seem to be carrying on with business as usual. There has been an increase in orchestral recording either for film or CD.

Being involved in the training side of the audio engineering industry, I was able to get some insight into the U.K. industry views. Several engineers commented that there were too many audio courses being provided. Large studios are frequently contacted by graduands who want to start as engineers. The SAE was particularly criticised in this regard (ie training regardless of industry needs). The consensus of the engineers I spoke to was that much training should be 'old school'. Employees must start as gophers (runners). A certificate would help get them in the door, but then a person aspiring to a position as Engineer would work their way up from the bottom. IT skills were mentioned at the BBC but a good attitude and the ability to get on with others was considered the most important. Some sites were investigating APRS certification of training which would enable them to manage the quality of qualifications.

PART 2c APPLICATION TO THE NEW ZEALAND SITUATION

The facilities I visited were among the largest in the world. In NZ there is not one studio that would equate to Sarm or CTS. This is not surprising considering our remote location and a population of under 4 million people. However, recording studios in NZ do exist that can provide the quality for a CD release that is perfectly acceptable worldwide. My only recent experience of such a facility would be Marmalade Audio in Wellington, though I presume that several of the bigger studios in Auckland would qualify in this regard. A comparison of technology shows that in the case of Marmalade the equipment is similar to that used in the U.K. Quested monitors are employed in the main control room. The recorder is an analogue 24 track (Otari) with Dolby SR noise reduction. Marmalade also run two Fairlight hard disk suites and these can be connected to anywhere via ISDN links. A notable difference is that in the U.K. studios have invested in RADAR and SADiE systems for hard disk recording and editing respectively. ProTools, which is popular in NZ, is only starting to be accepted in the U.K. This could be due to marketing factors making American products more accessible here.

Much of the equipment used by the top NZ studios is similar if not identical to that used in the U.K. Microphones are an example, where the same industry standard models are used in both countries. Other examples are near field monitors, and many of the signal processing and effects units. Below this level fits a tier of the industry in NZ that is not so obvious in the U.K. An example would be Matrix Studio in Wellington which records to 24 track on 3 ADATS. Such facilities are absent in the U.K. because the ADAT format is semi-professional and a client could get a better deal by shopping around the 2nd rank 24 track studio which would still record to 2" analogue.

Good results can be achieved with semi-pro equipment. One reason for this is that modern semi-pro equipment contains much of the specification of the much more expensive top of the range items. Manufacturers are always looking to improve their products in this very competitive part of the market. This has led to a trickle down of features from high end equipment (eg EQ Q control). Also the semi-pro market has diversified in depth with several versions of a product being offered (eg ADAT now comes in three models). This will allow NZ commercial facilities to keep their return on assets viable, while maintaining a point of difference from the home studio.

Proper utilisation of equipment resources is a problem for studio managers both in NZ and the U.K. In London the tendency is to have some equipment float between rooms (especially the digital multitracks). The other way of dealing with it is to hire in extra effects units or microphones for a particular session. Unfortunately this is not an option easily available to most NZ studios, so a greater equipment overhead is required. This tends to lower the standard of recording quality.

The idea that some U.K. studios are using of leasing rooms to freelance producers or engineers on a long term basis certainly has merit. It is really a way of fitting the project studio concept into the large studio. In NZ it would only be possible in a handful of studios. Most NZ facilities are more or less project studios in any case as they are geared towards rock band recording, or MIDI production.

It was reassuring to hear the various comments about audio engineering training. From this I was able to ascertain that the MAINZ programme is on target. We are listening to the needs of industry and providing not only computer studies and communication skills, but a broad audio training that will allow students to adapt to whatever changes they will face in the future.

There is a much larger degree of specialisation in the U.K. It is hard to imagine that one could earn a living being the flautist for one TV series in NZ. Mastering is seen

as a separate discipline. The Green Room records only classical music. In NZ we tend to be generalists, and an engineer might also be handy with a music score and/or a soldering iron. This may possibly change as telecommunications allows skills to be used from anywhere in NZ.

It is hard to draw absolute conclusions from such a brief visit to a relatively small number of sites. I went to some very professional setups and also sampled some audio production at a grassroots level. At the top end the level of professionalism exceeds current NZ standards. At the amateur and semi-pro levels I saw a variety of standards, as is the case in this country. The main factor in recording quality these days is not which mixing console is used. It is the skill of the operator. In the large studios, a Chief Engineer has typically 20 or more year's experience of studio work.

In summary, the provisioning of recording facilities in New Zealand is comparable with the U.K., keeping in mind the small scale of the industry here. In some ways I think we are ahead, and these would be as follows: our ability to adopt from and market to both the U.K. and USA. and the speed at which we can do that. On the other hand the superb technical legacy of the BBC, or manufacturing of big consoles is something we are unlikely to ever see in NZ. Then again maybe it's worth considering. I'm sure that in the first half of last century not too many would have expected a Kiwi bloke to be first up Everest. SSL have a niche market and rely on excellent software engineering, quality electronic manufacture, and reliable support. The number of units made is quite small and are largely hand made. This type of industry could be well suited to NZ economic conditions. We already have electronic companies exporting (eg Tait) and winning the America's Cup must have helped give NZ credibility.

The provisioning of recording studios is proportional to what the clients are spending. In NZ there is scant evidence of a industry infrastructure, and many clients are hopeful bands recording a demo tape. It is the advertising, film & video, and recording artists on a contract who bring in the big money, and therefore demand the very best of facilities. There are relatively few of these big budget clients in NZ and that is unlikely to change. One possible solution is to use our level of expertise to make products for overseas clients. These days, transfers of masters can be achieved without delay by using the ISDN.