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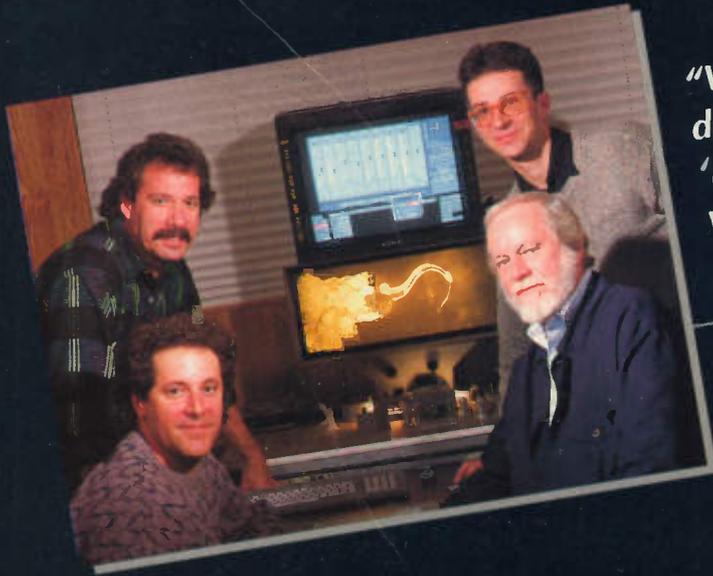
AND BROADCAST ENGINEERING



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August 1992
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Reproduction

Like it or not, almost anyone can be a record producer. It does not matter, for example, that the Producers' Guild wish to refine and protect the producer's role when major record companies appear happy for certain of their artists to self-produce their debut albums. And if you are a small label running on a small budget, what could be better than signing an artist who — in your considered opinion — does not require the services of an established producer commanding an established fee? But let's not rush to blame this apparent erosion of standards on the record companies when it is the availability of technology that is actually behind it.

Think about it: if recording artists were not quite so busy writing effects programs into their Alesis *Quadraverbs* when they should be writing songs, they would not be quite so contemptuous of the more conventional record producer's expertise. And if reverb units were sufficiently expensive, they would not be writing effects programs in the first place — instead, they would have to watch a 'proper' producer work on their music before they assumed they were competent to do it themselves. Or something like that . . . The fact remains, almost anyone can be a record producer.

What then of the old-style record producer in this brave new world? If the traditional producer's role is being undermined, is it not time to define a fresh one? If so, it is appropriate to air a couple of opinions I have nursed for some time. The first is based upon a comparison of the function of the modern record producer and the classical conductor — neither (necessarily) assumes responsibility for the composition of a piece of music nor the performance of it, yet both play a major part in the interpretation of a piece of music. Where the two disciplines diverge is in live performance; here the conductor's role is paramount and the producer's insignificant. Where they converge is in the studio; here the producer and conductor may be placed in complete artistic control of the recording.

In the classical world, discerning listeners make purchasing decisions almost as much on the strength of the conductor as on the recording. It is accepted that a conductor's interpretation can make or break a work regardless of its musical merit. Why should the same not be true of the modern record producer?

This theorising is supported by the recent proliferation of pop remixes and rereleases — while cover versions of old pop tunes have received little support from the marketplace, rereleases of old records have proven the worth of songwriters, artists and producers equally. (It is generally accepted that the original recording of anything more contemporary than jazz is the definitive version). And the continued demand for endless remixes (no less than nine on A Man Called Adam's recent single, *Bread, Love and Dreams*) would seem to validate the concept of remixing — regardless of the 'cheap way for a record company to repromote a single' scepticism expressed by many a critic. So, given that the current state of the recording art usually leaves multitrack tapes and (sometimes) MIDI sequences of a work-in-progress behind, why should there not be a place for producers going back over each other's work and offering alternative interpretations of music other than the classics? Such a future could see us not only choosing between the Kennedy and Ozawa versions of Vivaldi's *Four Seasons*, but also between the Rick Rubin and Creed Taylor versions of Run DMC's *Raising Hell*. ■

Tim Goodyer

Cover: Stellavox *Stelladat* portable DAT recorder

Radio star.



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Ideal for broadcast radio applications, the new PCM-7010 professional DAT recorder from Sony offers quick loading, instant start, fader start and simple remote or direct control. The recorder has four heads for simultaneous confidence monitoring and its modular architecture provides options for digital I/Os, memory start, timecode interface and an RS-232 interface option for PC control.

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Backed by the EBU recommendation of DAT as an exchange medium, broadcasters have been quick to realise its benefits.

Sony has pioneered DAT technology and in 1991, with the PCM-7000 series, launched its first DAT recorders designed purely for the professional. Since then over 1500 units have been delivered to customers in Europe alone, a clear sign of success.

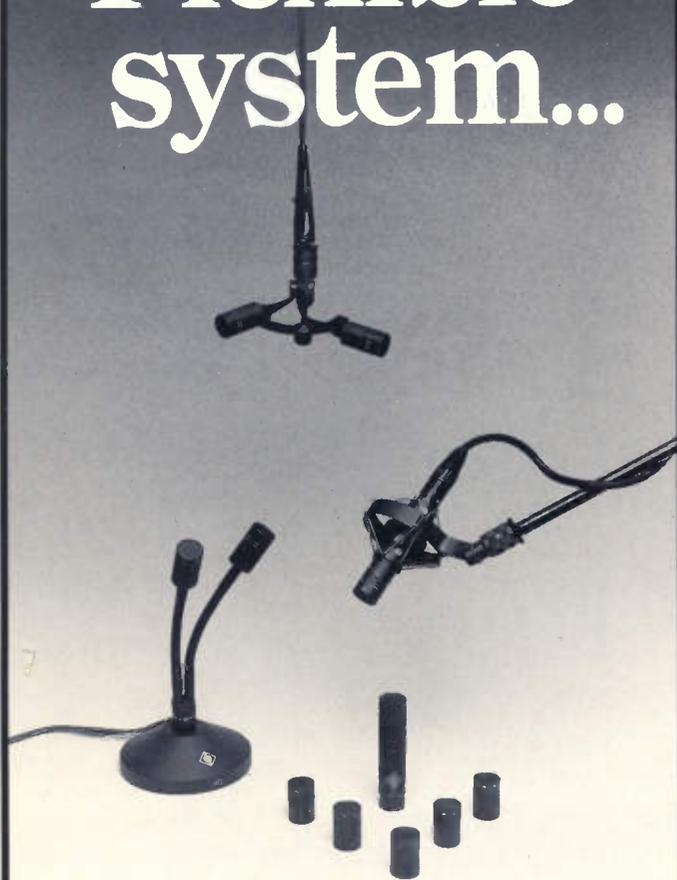
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Over the Rainbow

The word 'Christian' often conjures up visions of do-gooders running bazaars and enthusiastic youths strumming guitars and shaking tambourines. It is exactly these negative images which Jamie Gosney, founder of the new Rainbow Studios in Brighton, is striving to overcome.

Gosney worked in the hard world of rock 'n' roll for many years before he found salvation in God. As live sound engineer for bands such as the Jackson Five, Donna Summer and Dolly Parton he succumbed to the temptations of life on the road, in particular the lure of drugs. Many times he tried to kick a heroin habit with no success. However as a last-ditch attempt he joined Narcotics Anonymous and was moved by the joining of hands and prayer which concluded every session.

'I couldn't get the word 'God' out of my head for about three days,' he says. 'Then one day I was thinking about God and my whole body was filled with amazing warmth. It was like a miracle. I never touched drugs again and suffered absolutely no withdrawal symptoms.'

A little later, working as an engineer on the musical *Time*, starring Cliff Richard, he was visited by Chris Gidney from Christians in Entertainment. On the way to the theatre Gidney had experienced a Visitation from the Lord who had a message to pass on to Gosney; that he should go to Brighton.

So he did. For about two years he freelanced and helped to stage large Christian conferences using PA equipment purchased by the Claredon Church in Hove which he



had joined. As this arrangement was not working out very well the church gave him a 16-track desk and some PA equipment to work with. Then he had a revelation to build a studio.

This revelation coincided with another miracle — his wife was awarded some money from a long-forgotten legal action in America. In September last year he began work on Rainbow Sound and six weeks later in November it was ready for business.

The studio is in the basement of the Connaught Centre, half a mile from the centre of Brighton and originally the Connaught Mission serving the soldiers at nearby Preston Barracks. The building is largely empty although rooms are used by the Connaught Christian Fellowship and Friends of Ishmael organisations. Gosney and his partner Ed Corin

built the studio in consultation with designer, Phil Newell.

The studio desk was originally a Soundtracs *Megas* but a DDA *DMR 12* console has just been purchased, 'because we needed more professionalism,' says Gosney. The main tape machine is a Fostex *G24S* and the monitoring is Urei *813C Time Align*. There is a wide range of effects and keyboards, a MIDI suite in the corner of the control room and a large live room next door. Despite all this studio rates are only £150 for a 10-hour day. 'We're the only studio in Brighton offering 24 tracks at a cost for which most people ask for 8 or 16,' says Gosney. Effectively Rainbow plugs the gap between Advision at the top of the market and Brighton's small studios.

Gosney is quick to point out that his studio is not a temperance house. 'Although I'm a Christian I really hate the ritualistic nature of religion,' he says. 'Christianity isn't about wearing dog collars and swinging incense, it's about people.' Most of the commercial work is unrelated to Christianity — recent clients include LWT recording music for a drama about the Brinksmatt robbery and Marc Almond.

Only two jobs have failed to materialise due to clashing ethics — one a rap session featured obscene lyrics and another the hire of a DAT machine so a woman could bug her estranged husband. After a long

conversation with Gosney the latter abandoned her plans. Other clients include recent Christian convert and former Style Council member, Mark Edwards; two Christian record labels, Work UK and Kingsway and the Fabulous Sister Brothers, a 13-piece 'alternative gospel' band of which Gosney is a member.

As well as hiring and selling a range of audio products, Rainbow Sound has some far reaching plans for the future. Fellow Christian Malcolm Hill from Hill Audio, currently building a range of amplifiers and speakers for sound in churches, has also become involved. Gosney and Christian songwriter, Dave Fellingham, are negotiating to obtain a large hall and other empty rooms in the Connaught Centre to start a Christian art centre and school.

'We want to make it really happening, with 20 to 30 full-time students, and to put together two or three young bands to train in live and recording techniques and band management,' says Gosney. 'This would be exclusively for Christian musicians from all over the world to encourage them to do something really good here — if it's in God's name it has to be the best.' ■

Caroline Moss,
Rainbow Sound and Recording,
The Connaught, 131 Lower Road,
Brighton, East Sussex, BN2 3LG.
Tel: 0273 624048.



Digital Batman

The motion picture *Batman Returns* was shown to an invited audience last month at the Empire Leicester Square, London, as the first national film release in Dolby's *SR.D* digital soundtrack format.

The digital sound encoding, which gives six channels of sound, is placed between the sprocket holes of the 35 mm print.

Only a few cinemas in the US and UK are equipped to deliver *SR.D*.

Conventional cinemas will play the analogue Dolby Stereo soundtrack.

Agencies

● The US-based Apex System have appointed Stirling Audio as the sole UK distributor for their range of audio processors. Stirling Audio. Tel: 071 624 6000.

● Harman Audio have announced that they will be taking over distribution of the EAW range of professional loudspeakers. Harman Audio. Tel: 0753 576911.

● Philip Drake Electronics and Prism Sound have announced the signing of an agreement allowing Drake Distribution worldwide selling rights for Prism's range of digital audio signal test and control equipment. Philip Drake. Tel: 0707 333866.

● Now that Steinberg distribution is established within the Harman fold, here are some important phone numbers for users. Harman Audio. Tel: 0753 576911. Steinberg Helpline. Tel: 0753 554550. Steinberg new products Info. Tel: 0753 552340.

Top London Studios choose new desks

Abbey Road Studio and Air Recording Studios in London have both ordered digital consoles. In Air's case their second.

The first Neve *Capricorn* will be installed into Abbey Road's Penthouse Studio, and is the first of a possible two *Capricorns* which may be installed.

Air Recording Studios in Hampstead have ordered a second



DAR's award-winning *SoundStation Sigma* — see 'In-brief'

Logic 2 desk from AMS for audio-for-video postproduction work.

Contracts

● Carlton TV, awarded the weekday television franchise for the London area, have chosen an SSL *5000 M* Series console from Solid State Logic for their new technical studio and newsroom complex.

● Helios Professionele Audio in Haarlem have sold the first Amek *Hendrix* 40-channel mixing console in Holland to Beverley Beat in Winterswijk.

● Recent Genelec contracts include a *1030A* system to Tonstudio N in Cologne and PWL Studio in London. *1022Bs* to Channel 4 in London, and *1019As* to French TV company, Antenne 2.

● Walt Disney-MGM in Orlando, Florida, are to take delivery of an *MTR 100A* multitrack machine with full Dolby *SR/A*. Other orders include a *DTR900 MkII* for Polar Studio in Sweden and a *DTR900 MkII* for EMI Studio in Cologne.

● New York's Power Station have installed an AMS *Logic 1* digital mixing console in its new postedit suite.

● The Finnish Broadcasting Company, YLE, who already have three *Soundstation II Sigmas* in operation, have ordered their fourth.

● The Home Service have sold an *Optifile 3D* automation system to Intimate studios in Wapping, East London.

● The BBC's Open University production centre have bought a *Lightworks* random-access video editor.

● Berwick Street Studios, in London's West End, is the first UK music recording studio to install Audiomation's *Uptown 2000* moving

fader console automation system.

● The postproduction studios 1 and 2 of Swiss Television in Zurich have selected the Studer *990* digitally-controlled mixing console as part of the current studio restoration and upgrade.

● A third Tokyo recording studio have bought a Focusrite *Studio* console. Sunfield Crescent Studio, a brand new facility in the Kinuta district, is now set to take delivery of a 72-input desk, complete with GML Automation, this Autumn.

● Taiwanese broadcaster, PTV have ordered an AMS *Logic 2* digital mixing console for delivery in 1993.

Yamaha

This year's (trade only) British Music Fair saw Yamaha showing their new *DEQ5* and *DEQ5E* Digital Equalisers. Both units are stereo processors featuring 19-bit delta-sigma A/D and 20-bit D/A conversions and are capable of functioning either as 6-band parametric or 30-band graphic equalisers. Where the *DEQ5* is a fully-programmable unit, however, the *5E* is intended to operate as a slave — up to 23 *5Es* may be slaved to give 48 channels of live or studio processing. Also new at the BMF were the *D2040* 2-input by 8-output digital (AES/EBU and Yamaha Y2) channel divider and *EMP700* stereo multieffects unit *Q1131* 31-band single-channel graphic. The *D2040* features channel-independent EQ, delay and compressing-limiting while the *EMP700* handles compression-EQ and reverb, delay and mod in separate internal modules for series or parallel use. Also on display were the *MC04 II* series live mixing consoles.

Eastlake

Studio design company Eastlake Audio is currently involved in major projects in Spain, Malaysia, Thailand, Dubai and Nigeria.

In Bangkok construction is underway on a two-studio, Eastlake-designed complex on the top floor of the new headquarters building of RS Promotions, one of Thailand's largest recording companies. One studio will be SSL *4000* Series equipped, the other will feature a DDA desk.

Eastlake's David Hawkins commented, 'Although the Thai market supports strong sales — via compact cassette — of local recordings, it has until now lacked well-equipped, fully-professional studio installations. The market is now maturing and may become another potential venue on the circuit of those European and other artists who record internationally.'

Correction

● In our July issue we printed the wrong phone number for Hilton Sound Sarl in Paris. The correct number is Tel: +1 46 67 02 10. Fax: +1 47 89 81 71.

In-brief

● The Design Council have announced that Digital Audio Research has been awarded a British Design Council Award in The Consumer Products and Contracts Goods category, for its *SoundStation II* and *SoundStation Sigma* system.

● Plasmeac Systems and Elstree Studio Projects will work together to promote a joint capability in turnkey and systems installation for Broadcast and Studio.

● Chop 'Em Out is to become Europe's first independent mastering facility for the new MiniDisc system due for release later in the year.

● At IBC '92 DAR introduced its unique Sound Effects Library in a set of three optical disks and consisting of over 600 sounds.

● Hilton Sound recently turned Lansdowne Studios' percussion room into a 32-track digital studio for the dubbing of the film *Cool World*, starring Kim Basinger. The studio was built in just three hours.

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PEAVEY SDR 20/20

The *SDR 20/20* is Peavey's latest foray into the multieffects processor market, and the overriding philosophy in its design appears to have been to overwhelm the onlooker with facilities and flexibility. Thus it contains no less than 21 separate effects (several offering a variety of algorithms) of which it can use any eight in any order simultaneously. Many units of this type offer a small selection of fixed configurations, or chains of effects, while others allow the user to assemble a chain but only within certain limits, usually set by memory availability and sometimes by the manufacturer's idea of what is, or is not, sensible. The Peavey frees the user of any constraints of this kind.

The available effects include all the usual ones such as delay, reverbs, chorus, pitch shift, EQ and panning, adds some less common ones like compression, a noise gate and two exciters, and goes further still with distortion, overdrive, speaker simulation, an envelope filter and a stereo simulator. The complete flexibility allows any eight of these — including two separate stereo pitch shifts — to be thrown together in any combination, even offering the choice of series or parallel connection within the chain. The only exception to this rule is what Peavey call 'Ultrareverb', which eats up all the memory with its predelay, 5-band graphic and eight room types.

Even within the individual effects

some unusual options are provided. The reverb, for example, besides the usual plates, rooms, halls, gated reverbs and reverse effects, offers algorithms for springs, tunnels and stages; this last I found remarkably useful, giving a natural ambience without the hardness of a room or the gloss of a hall — very good for jazz. Even the speaker simulation has choices — two versions of the Peavey *Scorpion* speaker (open and closed back cabinets), a 4 x 12 and a 'British' type, which features rather insultingly in a preset called 'Nasty Amp'. EQ options go up to a full stereo 4-band parametric and include a simulation of guitar amp tone controls.

All this, plus the fact that the guitar-specific effects are splendidly raunchy and authentic, might give the impression that this is first and foremost a guitarist's toy box, but the front panel mentions the word 'Studio' and indeed the quality — with 16-bit A/D, 24-bit processing and 18-bit D/A — is certainly up to the most demanding studio applications. What does not sit so well with its studio aspirations is the surprising presence of large amounts of dry signal in many of the presets, including a lot of the reverbs. Obviously, if the unit is used in a conventional aux send and return studio configuration, this means editing the internal mix of all these effects before they can be used. This situation is made worse by the fact

that the supposedly dry signal has a very small delay or phase shift in it, which means that when it is mixed with the *real* dry signal nasty cancellations occur. Until I realised this, I had dismissed several presets as sounding rather unpleasant when in fact they are nothing of the kind.

Indeed, the effects are all very good; while the sheer quantity of processing power might suggest that this is a case of 'Never mind the quality, feel the width', nothing could be further from the truth. Even the pitch shifting — often the Achilles' heel of a box like this — is smooth and comparatively rasp-free even at intervals of over a fifth. The reverbs are natural and convincing or striking and powerful according to type, and some of the factory presets show off the possible combinations with a success rate that few manufacturers seem to manage — try the *Liquid Fifth* and *Echo Ocean* programs.

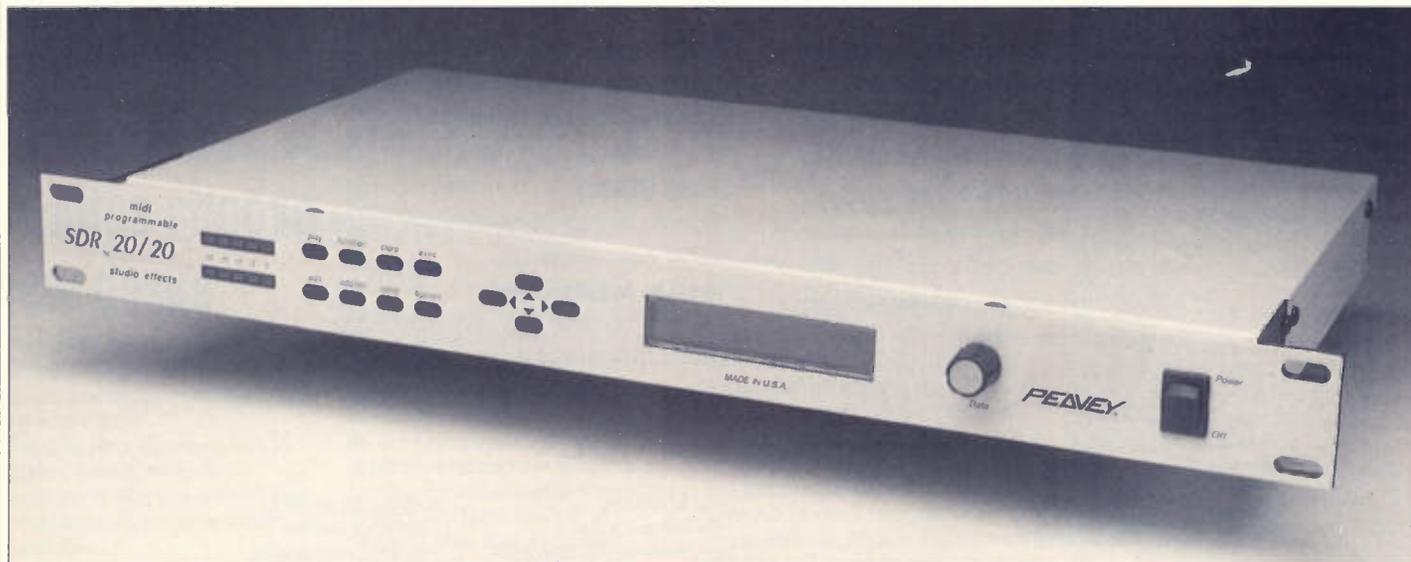
The danger with providing such versatility is often that the resulting assembly of algorithms, presets and parameters can become unmanageable, but Peavey even seem to have got that right. The system for editing the effects, by means of a few dedicated switches, four nudge buttons and a continuous data knob, is surprisingly intuitive, with a sensible amount of information shown legibly on its 20 x 2 LCD screen. The terminology for the memory storage is a little odd,

there are 128 factory presets, 128 user presets, and 256 programs in two banks, any of which can contain any of the presets plus a volume value.

MIDI implementation is comprehensive and includes controller and parameter mapping for each preset and a full SysEx editing protocol, all clearly detailed in the manual, which for once is reasonably well laid out, concise and informative. Ins and outs are balanced on three-pole jacks — happy to run unbalanced — and can operate at +4 or -10 with global gain adjustments in a utilities menu. There are no knobs other than the data knob, and no digital I/Os.

With a couple of reservations — easily got round in practice — I was extremely impressed with the *SDR 20/20*. Its clever combination of power, quality and friendliness seems to invite experiment and tinkering, which are usually rewarded with yet more interesting sounds. Many multieffects boxes are little more than 'me-too' products; the Peavey is definitely not one of these, and deserves a close look. ■

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SDR 20/20: even within the individual effects some unusual options are provided

DIY CDS PDQ



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SONY DPS-R7

Despite their many achievements, one thing not normally associated with Sony is signal processing, so it came as a surprise recently when someone started raving about the Sony R7 reverb unit. The R7 turns out to be part of the new DPS range, which also includes the D7 digital delay line, the F7 digital filter and the M7 Sonic Modulator. The various boxes are almost indistinguishable apart from the delicate pastel shades around the LCD displays, but all seem to offer a striking range of effects in their individual fields and to share a necessarily powerful, versatile control interface.

The R7 is possibly the most complex of the set and also the most generally useful. It probably offers more programmable algorithms and parameters than anything else I have ever seen — one particular setup would involve about 180 parameters in one preset — but the potential intimidation factor is very much reduced by the obvious thought which has gone in to the logic of programming the beast. To start with, there are 100 factory presets, which is a lot considering that they are nearly all reverbs — this is not a true multieffects box in the normal sense. True, some of the presets contain flanging and the like, but, by and large, they are simply a big assortment of reverb ideas, and whatever the job, one of them should come close.

The enormous variety is made possible by the multiblock structure of the unit. Each preset consists of an Input block, a Pre-effect block, the

main Reverb block (which itself contains either two or three reverb blocks), a Posteffect block and an Output block. The Input and Output blocks simply control levels and stereo panning, but the Pre and Posteffect blocks both offer a selection of fully programmable algorithms including gates, exciters, parametric EQ, and simple flangers, phase shifters and auto panners.

The main Reverb block offers two types of algorithm. One type provides true stereo reverberation from a stereo input, while the other provides two simultaneous stereo effects, one from each mono input, rather like the multiple effect programs on the Yamaha SPX-1000. Both also feature an initial simple Common reverb which is then fed into a choice of five algorithms. All the Halls and Rooms are in the Stereo set, while in their place the Mono-Stereo selection includes two types of Delay algorithm. The algorithms common to both are the Plate effects, the Gated reverbs and the Early Reflection algorithms. It is the stereo Early Reflection setup that has such a huge number of parameters in it, since it offers 48 separate reflections, with control of the time, level and phase of each one.

In fact all the reverb algorithms have enormous control over the critical early stages of the reverb, offering in some cases two predelays, a cross predelay (a delayed signal from input 1 going to channel 2 of the reverb and vice versa), three early reflections and a cross early reflection.

If all this sounds like no more than a catalogue of the R7's controls, it in fact represents only a part of the possibilities on offer; the point is that there is a vast number of variables, which could be seen as verging on the unmanageable. In fact making adjustments is less daunting than it might be for two reasons: first, the Block structure means that only one block is edited at a time, so you only have to wade through the parameters you are actually interested in; and second, on line context-sensitive help is built-in, and can even be set up to display automatically. This is one of many System options which can be used to tailor the unit to your requirements; others include the ability to display time in units of milliseconds, words, metres, feet or beats, a calendar and clock, automatic or manual loading of presets when the selector dial is turned, and even space for your name (and birthday!) which is perhaps no more than should be expected of a machine that says 'Good Morning' when switched on.

Simple adjustments to the overall scale or size of an effect can be achieved by means of the unusual Time Scale function, which alters all the time-related parameters within a preset — reverb time, predelays and so on — in the same proportion. I often found that this was all that was needed to fine-tune a preset to the requirements of the session. If you do venture into your own programming, the available memory space is vast — up to 256 User memories in addition to the 100 factory presets.

None of this would mean much, of course, if the effects themselves were run-of-the-mill. In fact I would say that the Halls and Rooms in the R7

are among the finest, most natural reverberation programs I have heard anywhere. Much of my work is acoustic — classical and jazz, for instance — and the R7 placed the music in completely convincing spaces, from delicate recital halls to atmospheric jazz clubs to large warm concert halls to bright, live studios. As if that were not enough, the more deliberate effects comprise an impressively complete selection from the subtle to the outlandish.

If I have a complaint it is about the manual, which is a surprisingly poor translation with some very odd and ambiguous terminology here and there. Flanging, we are told, 'sounds like rubbing' and 'properly raising the feedback gives the tone a manner' which can apparently produce 'a feeling of swelling'. (The D7 manual actually refers to 'complex intercoupling' between channels). The R7, by its very nature, is not a simple machine to master, and this does not help, amusing though it can be.

It should be clear by now, though, that any effort required to become familiar with the unit will be well repaid; this is a very remarkable reverb. A brief run through the presets on the D7 and M7 suggests that the quality and flexibility run right through the range, making the DPS series a very desirable set of processors indeed. ■

Dave Foister

**Sony Broadcast & Communications,
Jays Close, Viables, Basingstoke
RG22 4SB, UK.**

Tel: 0256 483 666

The DPS-R7 was kindly lent by Sony dealer, TCS. Tel: 071 258 3454.



The Sony processor family: the RM-DPS7 remote unit with DPS-R7 digital reverberator, the DPS-M7 digital modulator and the DPS-D7 digital delay

THESE CONSOLES SO MANY FEATURES COULDN'T FIT THEM ALL ON THIS PAGE



SOLO. A new range of consoles with more features per square inch than anything in its class. A pure and transparent sound that has made Soundtracs a standard in studios and on stages around the world. At prices that make sense for today's cost conscious professionals.

SOLO LOGIC. A production console available in 16, 24 and 32 inputs (36, 52, 68 in remix) with fader and mute automation as standard. Four band EQ with two swept Mids, assignable to channel and monitor. Six auxiliary sends - four assignable to monitors. Four stereo effect returns with two band EQ. Assignable group outputs. Machine control.

SOLO MIDI. A recording console available in 16, 24 and 32 input frame sizes (36, 52, 68 in remix). Automated MIDI muting on all channel inputs, monitor inputs, group outputs, stereo effect returns and auxiliary masters. Four band EQ with two swept Mids, assignable to monitor inputs. Six auxiliary sends - four assignable to monitor inputs. Four stereo effect returns with two band EQ, balance and level controls. Raised meterbridge.

SOLO LIVE. A sound reinforcement console available with 16, 24 or 32 inputs. Four independent sub-groups, right/left master and mono sum output. Four band EQ with two swept Mids. Six auxiliary sends. Balanced inputs and outputs. Four stereo effect returns. 48V phantom powering for all mic inputs. Raised meterbridge.

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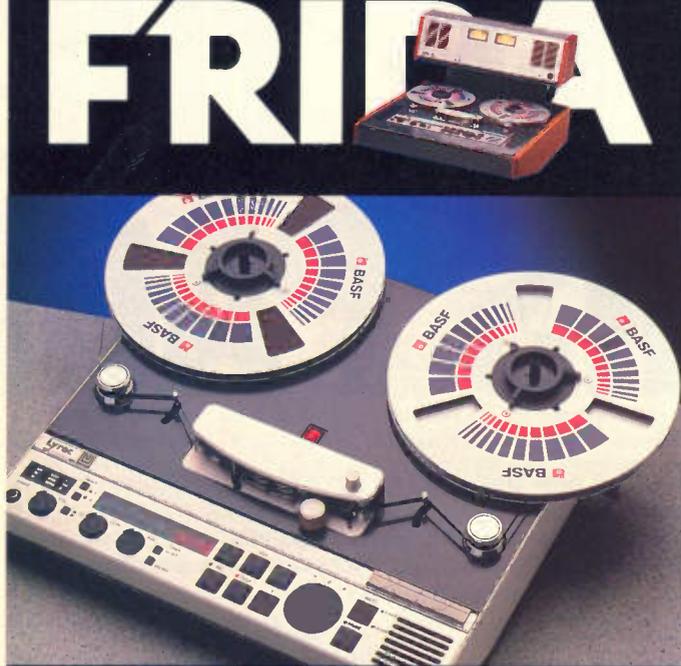
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LIVE SOUND

ON TOUR

A round-up of the major highlights of this month's live sound reinforcement scene

This summer has seen the most active UK and European touring schedule in one season (and for a fortunate few, the most lucrative business on record) as top US acts return to Europe in droves. They have joined some of the biggest-grossing UK bands in a glut of major shows and festivals.

UK and European PA rental companies who until early Spring were still reeling from the effects of last year's Gulf War on artists' confidence are now talking in terms of a record season, empty warehouses and work being turned down through lack of equipment.

Major US-based bands touring large arenas included Guns 'n' Roses, Prince, Michael Jackson, Stevie Wonder, Diana Ross, Def Leppard, Bryan Adams and Bruce Springsteen. From Europe are U2, Elton John, Genesis, Simply Red, Dire Straits and Iron Maiden.

But while the problem of last-minute PA bookings for middleweight tours has abated in the flurry of short-term activity, wider market pressures on UK and European PA firms appear, if anything, to have increased. The major factor that has prodded so many US acts to cross the pond for big-bucks arena tours — that is deep recession back home — has also inevitably knocked-on to the big America sound companies. Consequently, few in the industry over here see this hectic summer heralding opportunities to grab clients from rivals across the water.

The exceptions may well prove to be those with the newest technology. Britannia Row Productions has its Turbosound Flashlight PA out with Dire Straits and The Cure. SSE, with a new Electro-Voice TM-2 PA to add to its upgrade MT-4 systems, has also devised a new slimline delay system flying rig for Simply Red's summer stadium dates. Both companies claim this is their busiest summer ever. ■

CP cases

Middlesex-based manufacturer CP Cases have announced a new range of standard-sized flight cases and containers, called the 'Industrial Standards' range. The 40 standard-sized products available in the IS, CB, and SC Series cover most sound

and lighting equipment and obviate the need for expensive custom-built cases for storage or transit. CP Cases can be contacted on 081 568 1141.

New group

Celestion International Ltd, the speaker manufacturing division of Celestion Industries plc, and KEF Electronics have been acquired by Kinergetics Holding (UK) Ltd.

Under the new group, the two companies will continue to trade separately with what group chairman, Paul Banner, describes as 'complementary' product lines.

He says new venture capital injection will fund increased activity in R & D and marketing, adding 'we have... established one of the most exciting and impressive high-quality loudspeaker groups in the industry.' Celestion Audio's management, under Gordon Provan, remains.

Hill

Hill Audio introduced a new range of power amplifier and two new series of console at the APRS.

Top of the TSA range of amplifiers is 1602 (2 x 600 W/8 Ω) which features a single toroidal transformer with independent secondary windings for each channel. The amplifier uses only NPN ultralinear bipolar transistors which the company state improves reliability and reduces crossover distortion. There are three modes of operation — Stereo, Mono which feeds the left input to both sides thus halving the number of leads required, and Bridge which provides a mono output at twice the power of either single channel. Also included is a 'clip eliminator' circuit, and further circuitry to protect against failure of a supply rail, overheating, a direct short or DC on the outputs. All speaker connections are via Neutrik Speakons.

Gigmix is a range of semimodular consoles primarily intended for sound reinforcement applications which comes in 16/2, 24/2, 32/2, 24/8/2, and 32/8/2. The Stagemix series are also semimodular and are intended for stage monitor applications being supplied in 24/8 and 32/8 configurations. Hill Audio, The Wheelrights, Boughton Monchelsea, Maidstone, Kent ME17 4LT. Tel: 0622 741970. Fax: 0622 741971.

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Zoom 9000

The people that gave us the strap-mount and the half-rack guitar effects processor have now produced the Zoom 9000 and is best described as a hand-held. About the size of a portable CD player in an elaborately raked plastic casing, a selection of wobbly rubber buttons are arranged around a small but well segregated LCD that provides surprisingly large amounts of information once the principles are grasped.

Twenty memory locations are allocated and accessed via dedicated BANK and PATCH buttons in five banks of four patches. Each patch can run one effect from five effect types simultaneously classed roughly as compression and distortion, EQ, modulation effects, delay and reverbs although it has to be said that the capabilities contained within these sections far exceeds their rudimentary titling. For example, modulation effects include envelope following and pitch shifting, and reverbs include additional delay algorithms. It is interesting to note that each patch can be assigned an output level of its own in addition to an overall volume control and the 9000 has amp-simulation circuitry built-in for DI-ing. Another feature worth mentioning is the inclusion of a relatively dependable intelligent guitar tuner that recognises the open string played and indicates the required pitch correction.

Connectors are provided on the back panel for the instrument input and stereo output on standard jacks, a DC PSU (in addition to battery operation) and a stereo minijack line input for all those play-along-an-axe-master tapes which can be mixed along with the Zoom's processing. Phones are connected at the side again on a stereo minijack. Needless to say once all the holes are filled the 9000 begins to look a little unsubtle and unstable — its lack of physical size, and most particularly weight, inclines it to follow you around the room on the end of your headphone lead.

This observation makes the provision of the FC01 foot controller a little curious. The duplicating of the BANK and PATCH buttons of the 9000 on a smallish, but rugged, pedal board makes one question if the 9000 is intended for gigging. Both devices



A guitar tuner can recognise the open string played and indicate the required pitch correction

are certainly up to the task but gaffa-taping a brick to the 9000 first should certainly be recommended. The combination is likely to find most use in the less animated environment of a studio but the FC01 has one glaring fault.

Bypass on the 9000 mother unit is accomplished by pressing one button, on the foot controller the player must flamenco-foot-tap the bank switch up to Bypass status and then, as if that is not enough, select a patch at which point a red LED illuminates to congratulate him. Not exactly spontaneous stuff and certainly a few generations removed from the stamp on it and look good during the keyboard solo approach. Bad.

Entering Edit mode the excellent factory presets, which can be recalled if need be, can be tweaked or reprogrammed. The BANK and PATCH selection buttons transform to give single button access to the five effect

types and patch level control. Once an effect type is called up its constituents can be scrolled through, selected and its parameters adjusted. The number of adjustable parameters per effect are restricted to two or three although it has to be said that within the scope of the 9000 this is ample. Had the 9000 been released earlier in the company's genealogy then perhaps this would have been more of a hit and miss affair. As it is, the device draws and distills from all that is best about their products from proven experience.

The fundamental distortion tones, which have a compressor at their disposal, are decidedly Zoom, ranging from a *crystal clear clean* through a slightly *heftier* rhythm and onto *dirt* tones.

Dirt is represented by the traditional *crunch* flavour, a *spicier* overdrive and an altogether *smoother*

distortion. They are analogue but tubes they ain't — an almost irrelevant observation because it is a Zoom. EQ offered is fixed high and low frequency or an enhancer but the modulation effects section contains a gorgeous phase-driven midrange equaliser along with the usual choruses, flanges, etc.

Any doubts about the power of the device are laid to rest with an excellent example of Zoom pitch shifting which, while not intelligent like the 9030, is still as fast and consistent. What other manufacturers should note is that it is not the tracking speed of a pitch shifter that is all important so much as the shifted note's envelope. Reverbs are basic but apt.

A few minutes with the 9000 and it becomes obvious just how far ahead the company is in this game. The sheer peculiarity of some of the number crunching audio capability is quite unlike anything that other manufacturers have to offer. Special mention goes to the pitch shifter, cry baby and envelope follower, midrange phase EQ, a peculiar amplitude modulator, the ease with which the device adjusts to different input levels despite a lack of input control, and how remarkable quiet it is. On the downside I found it a little too easy to surprise the compressor and the degree of fine mix control between the dry and reverb signals lacks resolution.

But it all sounds decidedly modern and the 'produced' sound of the other Zoom family members is present in the 9000. There seem to be no compromises in the sonic performance of the 9000 — price penalties are inflicted in the form of reduced flexibility, less control, fewer memories, no MIDI and fiddlier than average access.

The 9000 pretty much epitomises the real influence that technology has had on the music sector. Compact, wonderful sounding and dead neat. If you are a guitarist still looking to jump into the guitar, processor, rest or even a lapsed player, the Zoom 9000 quite simply promises instant gratification for very little outlay. Quite irresistible.

MCMXCIX, 708A Abbey Road, Tudor Estate, London NW10 7UW. Tel: 081 963 0663.

US: Zoom, 385 Oyster Point Boulevard #7, South San Francisco, CA. Tel: +1 415 873 5885.

Studio Sound's Music News is compiled by Zenon Schoepe.

Serious users the world over are reaping the rewards that the DAT format brings: cost-efficiency, convenience, reliability and audio excellence. As you might expect from the world's No1 DAT Centre, HHB has been working closely alongside the 'World Leader in Digital Audio' to build a DAT product range that really delivers the goods. And the briefest glance at our latest Sony DAT line-up is all it takes to see that there is a solution for every application, from the simplest audio recording to the most advanced audio-for-video post-production.



Even digital recording on the move can now be a serious business. There's the ultra-compact TCD-D3 DAT Walkman, combining low cost with a superb design and an impressive four hour recording capability. Consider the highly successful TCD-D10 portable family. As well as balanced XLRs, the rugged TCD-D10 PRO MkII adds 'absolute time' recording, with HHB offering the exclusive option of a 48v phantom power modification. We can even supply the original TCD-D10, modified



for DC recording. But as anyone will tell you, DAT excellence is not based on hardware performance alone.

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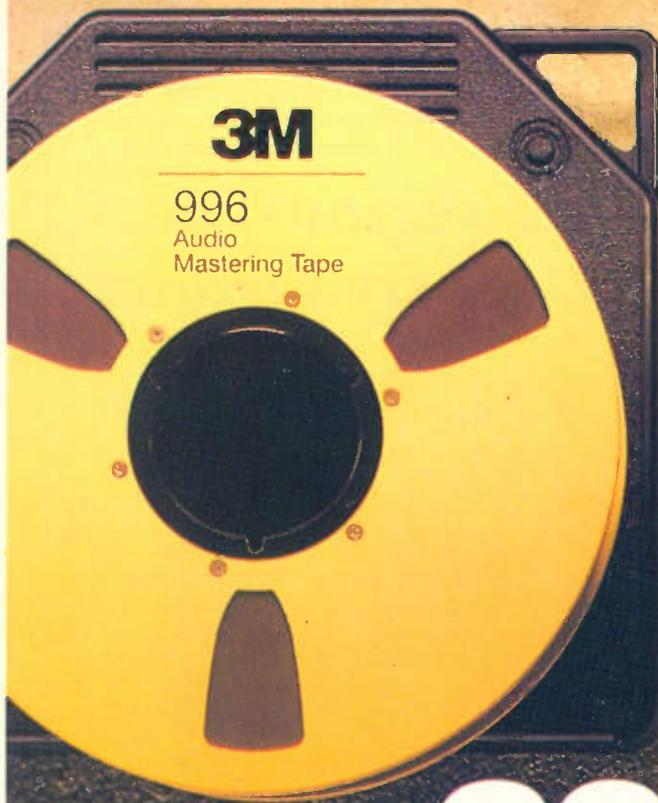
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KRK 7000, 9000 and 1300 nearfield monitors

Electro-Voice

Electro-Voice have launched two new cost-effective dynamic vocal microphones — the MC100 and MC150. Both models feature an 'up-close' bass boost designed to increase overall output level allowing gain to be reduced thus minimising feedback. Additional resistance to feedback is achieved by directional polar patterns, while a built-in 'blast filter' protects against popping and sibilance. The MC150 includes an integral shock mount that reduces handling and vibration noise. Both mics have on-off switches and ergonomically contoured bodies. UK: Shuttlesound Ltd, The Willows Centre, Willow Lane, Mitcham, Surrey CR4 4NX. Tel: 081 646 7114. Fax: 081 640 0106.



Cyclone tester

Cyclone Systems have launched the Yibbox Audio Line Tester. The 4-in box outputs a 400 Hz tone at four selectable levels via balanced XLR and unbalanced 1/4-in jack sockets. The unit also detects phantom power (or RTS volts), and incorporates an electret microphone which will override tone enabling talkback. Cyclone Systems Ltd, 2 Longlands, Hemel Hempstead, Herts HP2 4DG. Tel: 0727 830479.

KRK nearfields Studio Pak

Californian company KRK have introduced a new series of time-aligned nearfield monitors. The KRK-7000, 9000 and 13000 feature newly designed 7-in, 9-in and 13-in woofers respectively. All drivers utilise Kevlar, a lightweight synthetic material known for its strength. Woofers are formed from honeycomb Polyglas and Kevlar, while the inverted-dome tweeters are pure stamped Kevlar. Since the new line uses the same components as previous models upgrades are possible.

Audio Intervisual Design, 1032 North Sycamore, Los Angeles, CA 90038. Tel: +1 213 469 4773.

Studio Pak from Defsoft is a collection of 14 programs and utilities designed to aid producers, engineers and musicians. The software, which runs on the Sharp IQ series of organizers, will calculate 'in time' echoes for a given tempo; derive time code offsets from the tempo and bar numbers of a song; display chord shapes for both guitar and keyboards; provide an audible and visual metronomic reference; relate the properties of tempo, tape speed, frequency, percentage, harmonizer ratios, and pitch; analyse up to nine time code cues and derive a series of tempos that will match beats to events on film or video. Plus other functions.

Defsoft, 17b Yew Grove, London, NW2 3AB. Tel: 081 450 3705.

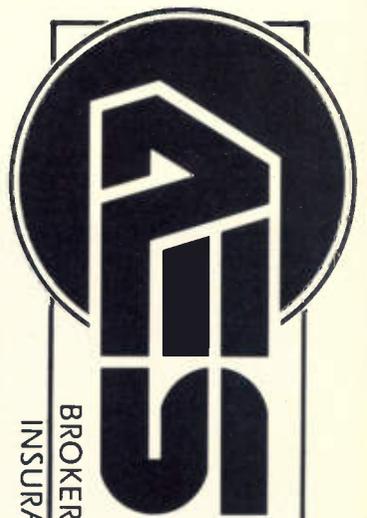
BEK digital link

BEK Technologies have launched the Audio Plex/Pro-Line digital link. This digital multicore transmits audio over both copper wire and fibre optic cables and provides a cost-effective replacement for multipair analogue cables. 16 channels can be digitally transmitted over a single twisted-pair cable, or 64 channels bidirectionally on fibre. Audio Plex has been specifically designed to withstand failure and features FRTC (Fault Tolerant Redundant Communications) which provides full redundancy on four separate outputs. Duplication of both copper and fibre links ensures against communication loss even if one of the links becomes broken.

UK: Meriden Communications, 33 Greenwich Market, London SE10 9HZ. Tel: 081 293 0909. Fax: 081 293 5856.

Sound Ideas

After two years in the making, Canadian company, Sound Ideas, have announced the General Series 6000 digital sound effects library. Consisting of over 6000 effects spread across 40 CDs, this 50-hour set is the largest digital sound effects library ever put together. The collection contains new and expanded categories including an extensive Animal section, Transportation, Crowds, long ambience effects from around the world, Weather, Aviation, Military, Foley sounds and so on. Also featured is a collection of sounds compiled by four top sound designers. Sound Ideas, 105 Beaver Creek Road, Suite 4, Richmond Hill, Ontario L4B 1C6, Canada. Tel: +1 416 886 5000. Fax: +1 416 886 6800.



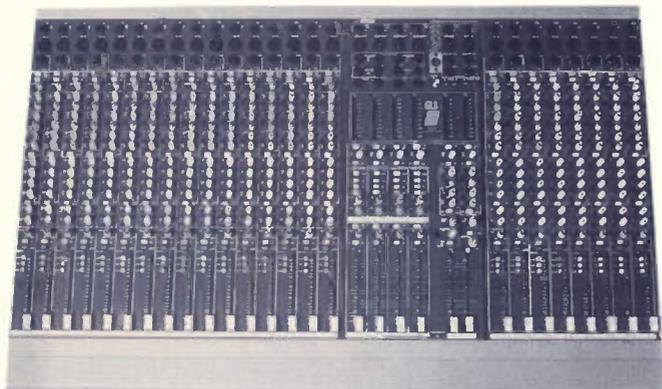
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Allen & Heath's GL3

Allen & Heath

Three new consoles have been announced by Allen & Heath; they are the *GL3*, *GS3V* and *Saber V*.

The *GL3* will eventually supersede the four-bus *SR* live desk. Available in standard 16 and 24-input formats the console is expandable in blocks of 8 channels up to 32. Features include 4-band midsweepable EQ on the

inputs, and 3-band midsweepable EQ on the main outputs which may be switched to aux 5-6. The six aux outputs are switchable into the main outputs thus changing the console from a 4-group, front-of-house, mixer to an on-stage, 6-group, monitor mixer.

The *GS3V* contains all the original features of the *GS3* recording console with the addition of *V5* software for fader and mute automation. The

system includes VCA grouping with nestable masters and three methods of group muting, plus extensive mix trim facilities. An optional SMPTE reader-generator is available.

The *Saber V* recording console also features *V5* automation and will support both VCAs and moving faders. An Intelligent Digital Display system provides programmable meter ballistics and automation information. The desk includes all the facilities found on the *Saber Plus* console.

UK: Harman Audio Ltd, Mill Street, Slough, Berks SL2 5DD. Tel: 0753 76911. Fax: 0753 35306.

and frequency response at 30 Hz to 20 kHz, ± 2 dB. Mid and HF units have been time delayed for accurate phase response, and a Differential Error Correction circuit has been added to minimise distortion. Two models are currently available, the *S250/2* integrated system and the *S250/3* with separate amplifier rack and cabinet. Both cabinets can be supplied in a variety of finishes.

Audio Solutions Ltd,
9b Ashbourne Parade, Hanger Lane, Ealing, London W5 3QS.
Tel: 081 998 8127.
Fax: 081 997 0608.

Solutions

Audio Solutions have introduced the *S250* active speaker system. The three-way design, with electronic crossover filters, features 120 W triamplification. Bass and midrange drivers have Kevlar cones, while the HF unit has an aluminium dome — all drivers are overload protected. Output level is specified at 118 SPL,

Court products

Court Acoustics have released the *CN240* two-way or four-way active processing crossover-controller, and the *System 250* range of loudspeakers featuring the company's *Lectralinear* high-efficiency drivers.

Court Acoustics, Lectra House, 119 Arthur Road, Windsor, Berks SL4 1RU. Tel: 0753 833524. Fax: 0753 832812.



Q108 - 2 way active system with twin integral 100W power amplifiers and high quality BSS crossover network. 8" bass driver/1" soft dome ferrofluid cooled tweeter.

C L O S E R T O T H E

Flex-EQ

Audio Developments have introduced the AD083 *Flex-EQ*. This true parametric equaliser is supplied in a rack of up to eight modules, with each module containing a bank of three state-variable broadband (20 Hz to 20 kHz) filters. Each filter includes a bypass switch, and if more than three filters are required per input, the modules can be cascaded to offer a total of 24 filters for one input. The filters use constant-Q topology and feature narrow-band notching (-50 dB), plus HF and LF shelving characteristics. The company claim there is no interaction between frequency, bandwidth and amplitude controls. Each module is RFI suppressed, with an electronically balanced input, and output transformers are fitted as standard.

Audio Developments Ltd, Hall Lane, Walsall Wood, Walsall, West Midlands WS9 9AU.

Tel: 0543 375351.

Fax: 0543 361051.

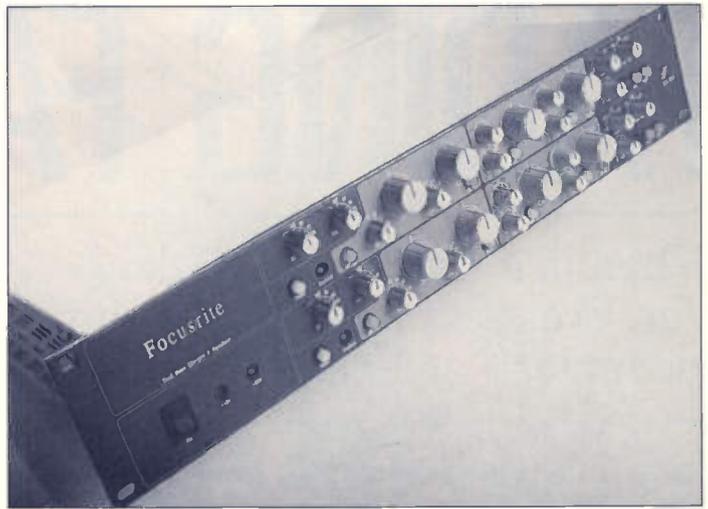
Sony range

Sony have announced the *DPS-F7* Digital Filter Processor which will be available from the end of the year. As a complement to the existing range of cost-effective DPS 32-bit processors, the new 1U will offer 10 basic algorithms including parametric EQ, two modes of dynamic filtering, subharmonic generator, vocoder, exciter, percussion synthesiser and a simple mono synthesiser, while an additional nonlinear mode mimics the effect of analogue tape compression. Included are 100 factory presets, plus 256 locations for user settings. As with the other DPS processors, the *DPS-F7* can alternatively be operated via the *RM-DPS7* Remote, which is capable of addressing up to 15 units.

UK: Sony Broadcast & Communications, Jays Close, Viables, Basingstoke, Hampshire RG22 4SB.

Tel: 0256 55011.

Fax: 0256 474585.



Focusrite ISA215

Focusrite

Available from September '92, the *ISA 215* combines two independent mic preamp-equalizer channels together with an integral PSU in 2U of rack space. Also new is the

ISA 230 Stereo Compressor-Gate retaining the transformer-balanced output stages as used with the *ISA 130* dynamics unit.

Focusrite Audio Engineering Ltd, U-2 BE, Buss. Centre, Cores End Road, Bourne End, Bucks, SL8 5AS, UK. Tel: 0628 819456.

SOUND

H108 - Passive version of Q108 with same driver complement and performance characteristics.

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Their exceptional capability in equalling full size system performance in a limited studio space or where system portability is necessary, is a further part of their considered design. In all, the 108 Series embodies all of Quested's

extensive experience in designing the right system for the right location.



An AKG Group Company



SINGAPORE • Studer Revox Audio Pte Ltd. Tel: 250 7222 Fax: 256 2218. TAIWAN • Linfair Engineering & Trading Ltd. Tel: (2) 321 4454 Fax: (2) 393 2914. USA • AKG Acoustics Inc. Tel: (1) 510/351 3500 Fax: (1) 510/351 0500.

FADING FAST

When is a fader not a fader?
Tim Frost explores the evolution of fader
technology at Penny & Giles

The inclusion of Penny & Giles faders has traditionally been the mark of a 'better class' of mixer. From the audio industry perspective, the company is seen purely as a manufacturer of plastic conductive faders for the pro and (very) top end of the hi-fi market. In fact, the Welsh-based P&G Studio Equipment is only one of two dozen companies and divisions that make up Penny & Giles International which has been going in one form or another since 1955.

The history of the company has always been one of control and data acquisition; producing devices that monitor all forms of movement and activity. This started primarily in the aviation industry, which is still a substantial part of the group's activity, but over the years has spread in all sort of directions; transducers for medical research and environmental control; data recorders; in-flight recorders and high speed military satellite data recorders. As a group, they'll have a crack at anything in these fields of measurement, data and control. Consequently, as well as linear and rotary faders, P&G make computer mice, tracker-ball units for military uses, pressure-sensing controls and goniometers, of which more later.

P&G's fader production came on line in 1967 with the first units being wire-wound, these are hardly ever seen now, although they still make some for specialist non-audio applications.

Wire-wound faders produce small, but finite, stepped increases in resistance as the fader contacts each wind of the wire. With the availability of conductive 'paint', P&G became interested in the development of an infinite

resolution fader, again primarily for avionics, with the same reliability and constancy as the wire-wound units. Having gone into production with the plastic fader, it was only a matter of time before someone in the audio industry picked up on it.

That someone was Rupert Neve and when asked to provide faders for mixers the response then was not, 'What size?' or, 'Do you want it logarithmic or linear?', but, 'Fine — but what is a volume control?'

It appears to be the way P&G have got into several niche markets, which they have then gone on to fine-tune and develop for themselves.

As well as Neve, early faders went out to broadcasters like the BBC and Thames TV who's engineering departments then were making their own desks, and occasionally '60s vintage faders still turn up for repair.

When they were introduced, plastic faders changed the way faders looked and worked. Until then quality faders were either rotary or quadrant devices travelling over a gentle arc; the conductive plastic devices created the flat slider that has remained a consistent feature of mixers ever since.

But over the last couple of years, computer, VCA and digital applications have changed the way we look at the fader and what its function should be.

As digital processing drops in price, manufacturers are increasingly experimenting with digital mixing systems which make quite different demands on the linear or rotary controller. Faders need no longer to be inserted into the audio chain, they can be used to alter the gain of VCAs, and directly or indirectly, control digital processors.

So Penny & Giles are celebrating 25 years of fader manufacturing at a time of major change. Their traditional market is not as strong as it used to be. Overall studio demand has slowed up, and while automation has increased the demand for motorized faders, some mixer manufacturers are now looking to build their own rather than buy them in. So where does MD David McLain plan to develop P&G next if it is not to be squeezed from one end by a stagnant maker and from the other end by new technology.

'Traditionally we are in the top end of the market and we have had to work hard to keep the market we have. What we recognise is that our market is being squeezed from both ends, so if we want some success in gaining extra market share, we see the need to make a low-cost fader to attract

the semipro market. We still produce the best faders in the world but we recognise that we have to move on.'

Somewhat unkindly, by 'semipro' David means not so much the bedroom and personal end of the mixer market, but rather companies at the level of DDA or Soundtracs — the manufacturers who are supplying quality production line desks, where P&G have only occasionally been taken up as an option.

The biggest difference between the existing product lines and the new faders, apart from price that is, is that it will be a limited range and, by P&G standards, a production-line product.

P&G traditionally build to order; you want a specific size, shape and law, you can have it. They currently run to over 1500 variations, and everything is built in batches, with 200 faders of the same type being considered as quite a long production run.

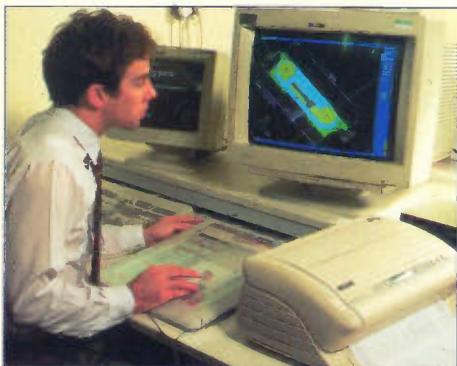
Producing a fader is a hand-engineering process; the metal cases are turned from solid bars, the conductive plastic track is hand-silk-screened onto a metal blank in varying thicknesses according to the resistance required.

The plastic base for the tracks is formed directly onto these metal blanks and the conductive track surface is transferred to, and becomes part of, the plastic during the moulding process.

Every fader is tested and manually fine-tuned to meet its acceptance window and when they are passed fit, each one is individually serial numbered. While the standards are 'traditional' P&G are not backward in engineering or R&D terms. On the factory floor there is a substantial investment in computer-controlled milling machines and test rigs. The R&D effort is also substantial, embracing new ideas, new materials and electronics. But it tends to be reactive, equipment manufacturers and developers come to P&G with ideas and they develop and build accordingly, and the demand, according to Technical Manager, David Hoare, is increasingly for controllers working in the digital domain, 'Traditionally we are an analogue product supplier, the market is now moving more to digital and digital control, and we are looking at a new range of technologies.' One of P&G's first commercial products developed purely for a digital mixer is a fader which went into production in 1990, developed jointly between P&G and the French desk manufacturer ABAC.

Although it doesn't look terribly exciting, the endless-belt is generically different to faders used on existing desks. Currently all faders are absolute, the position of the fader knob designates a fixed and repeatable absolute value of gain, pan, EQ, or whatever it is that the fader is being used to control.

The ABAC fader, as well as being a digital output device, is a relative device. A flexible continuous rubberised belt with no markings replaces the fader track and knob. This works just like an escalator or tank track; it has no end stops, and no absolute position. It passes on data about upward or downward movement only, it doesn't care where on the track your finger started from. An LED bar shows how much 'gain' has been applied by moving the track.



Computer-aided design in the Blackwood factory

In the digital domain there are a couple of advantages in using a continuous fader. It can be dynamically configured by the desk's processor, altering its sensitivity — small movements can produce large changes, or large movements can generate only small level changes, useful for very fine adjustments.

The continuous fader also replicates the function of a standard motorised fader. Since it is the LED line rather than the fader knob that shows the current settings, there is no need to motorise the fader knob to put it in the right position.

When digital control and full digital mixing become commonplace, any type of digital controller could be used, from the linear faders, to mice, touch screens on the new wave of 'virtual reality' 3D controllers. New ideas are being tried with varying degrees of success and acceptance.

Seen in this light, the continuous-relative fader is an interesting concept but while launching a commercial version of it at IBC, Hoare recognises that it has limitations as well as advantages, and will not suit everyone.

'We've taken the basic principle and made it a lot more attractive to the users. It is more expensive than a manual fader but cheaper than a motorised one.'

'However people will still want to use a fader, as you can see immediately where you are rather than looking for the relevant display.'

The main thrust in P&G's research is towards a traditional fader, but one that produces a digital rather than analogue output.

Hoare explained the importance of producing a digital output directly from the fader, rather than adding the A/D conversion-processing to the mixers main control processors. 'As desks get more sophisticated, the processing and DSP chips will have to work even harder. Developers will want to off-load as much work as possible to intelligent input-output devices away from the mixer's main processors.'

'A fader with digital output relieves the main processor of a lot of the work as the processor does not have to grab the analogue signal and convert it.' The first move has been to develop a 12-bit digital output fader, which is essentially a P&G fader unit complete with built-in A/D converter.

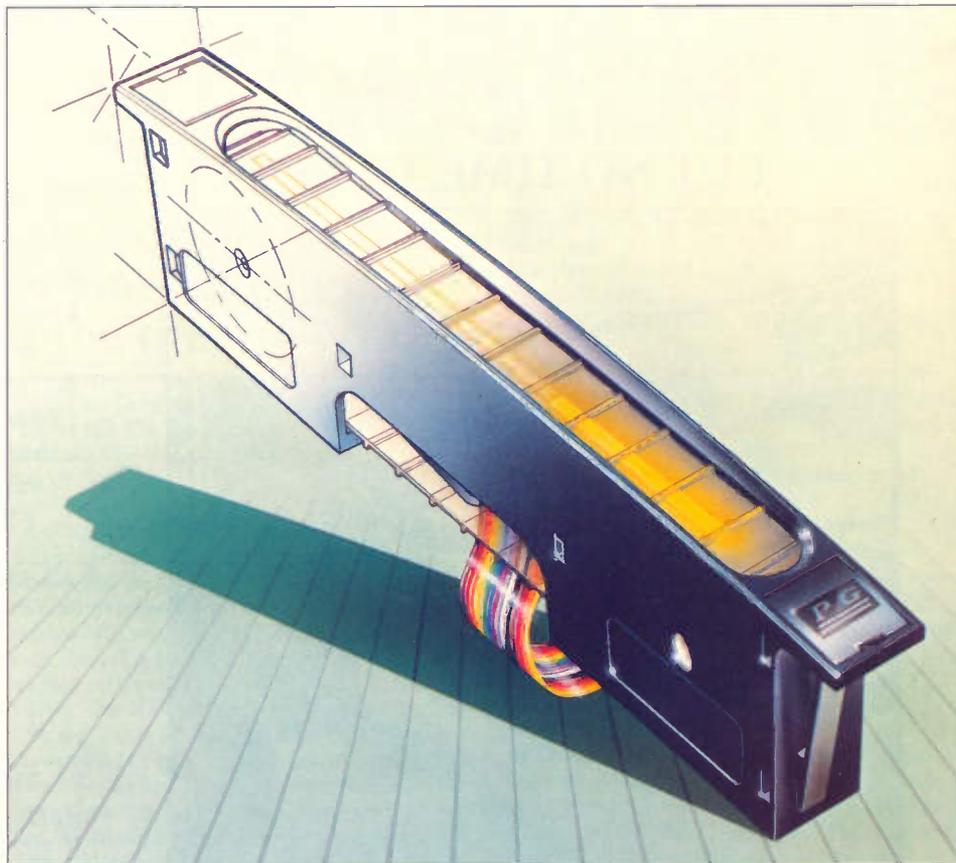
'It is nothing spectacular,' continues Hoare, 'it is just a matter of choosing the right A/Ds. These have come down dramatically in price and these faders are only about 50% more expensive than an analogue-only version.'

'This is readily available technology, it has only been waiting for the price of A/Ds to come down, and by the Autumn we will have a viable and sellable product.'

Taking a standard analogue fader and adding A/D electronics creates a two-stage product, with additional component and construction costs. It will never be a totally cost-effective solution, no matter how much reduction there is in the price of A/Ds, but these will offer a useful intermediate step until fully digital faders can be commercially manufactured.

Hoare and his team are working on this idea at the moment.

'In terms of cost-effectiveness the fader with a built-in A/D is going to be borderline. If you can



The compact endless-belt controller, featuring an optically derived digital output

make it completely digital from the outset, as the demand increases you will be able to build it more cheaply and you are going to be able to offset the development and manufacturing costs fairly quickly. We are looking at a direct digital fader possibly using optical methods but we are pushing very hard against technology; we can do it now, but it is very costly.' The digital faders return the industry to stepped rather than infinite resolutions. This resurrects the question of how fine the resolution need be for acceptance by the mixer manufacturers.

Sales and Marketing Manager, Bob Smith, has been keeping tabs on the industry's demands. 'When I ask the market what they need, it is normally 10-bit resolution, although some are asking for 12-bit, so if we work to 12-bit resolution then we will be satisfying all of the market. But ideally we want to use a technology that is independent of resolution, but that is where we are pushing new materials and technology to their limits' The end result of the R&D will be a set of fader and control building blocks. These may combine a substantial amount of the control intelligence within the fader unit, regardless of whether the physical control device is a linear or rotary fader, joystick or other variations on the theme.

As well as linear and rotary controls, P&G are working in two particular areas of movement sensing. Working closely with Strathclyde University in the biometrics field, they are refining goniometer technology — a sensor that looks like a piece of wire but senses any bending action — how much and in which direction the wire is being bent. Apart from its original medical applications to aid the analysis of joint movement, interest is spreading with users in a variety of fields including sports shoes manufacturers, virtual reality gloves and the *Spitting Image*

puppet team.

The other item is the force joystick, a device the size and appearance of a small quad-pot. Unlike a quad-pot, the joystick senses pressure and reacts to the degree of force applied. It can also respond to acceleration and could work in two or three dimensions. An ordinary fader can sense only position information and only in one axis. A single force joystick, with the right software could be made to sense force, rotation and acceleration in all three axes — nine times the data from a single control device. It is not compulsory to use all this control facility, but it does make a lot more options available and opens up a lot of new possibilities; and nobody knows which ones are going to be viable.

The evolutionary approach is not going to help, so it's back to the drawing board in every sense for Dave Hoare.

'We have to look at the whole scenario from scratch. We are fundamentally rethinking the requirements and needs of the fader, and at the very least our work will help us define new varieties of tactile interface.' ■



A fader testing station with a touch-screen terminal

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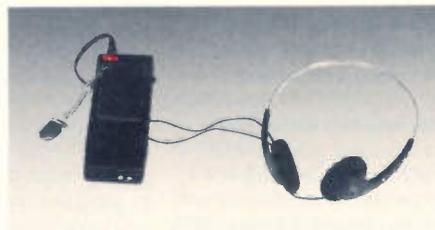
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AUDIO RECORDING

Studio Sound have compiled an updated list of equipment on the market from information available at the time of writing

Analogue tape recorders

- **Saturn:** The 824 analogue tape machine is a 2-inch 16/24-track with full autolocator and has automatic digital alignment as an option. The 624 is also a 2-inch 16/24-track machine based on the 824 design but without autoalignment. The remote is a much smaller version of the 824s. **Saturn Research.** Tel: 071 923 1892. Fax: 071 241 3644.
- **Sony:** APR-24 is a 2-inch 24-track machine with remote. The audio electronics are based on the 5000 series mastering machines, 5000 series range of mono, stereo and 2-track mastering machines on 1/4-inch with a stereo 1/2-inch version and centre track time code options. **UK: Sony Broadcast & Communications.** Tel: 0256 55011. Fax: 0256 474585.

USA: Sony Corporation of America. Tel: +1 201 930 1000.

- **Otari:** The MTR-100A is available in 1-inch 8-track, 2-inch 16-track, 16/24-track and 24-track versions, featuring automatic alignment of audio functions. The MTR-90 III available as 1-inch and 2-inch, 16-channel, an upgradable 16-channel version and the 24-channel. The MTR-15 master recorder provides 1/4-inch and 1/2-inch tape formats in mono, stereo, 2-track and 2-track with time code. The MTR-12 1/4-inch 2-track with and without centre track time code; 1/2-inch 2-track and 4-track. The MX-80 range is available as 2-inch 32-track, 2-inch 24-track, a 2-inch 24-track prewired for 32-tracks, and 2-inch 16-track. MX-70 1-inch 8-track or 16-track recorders. The MX-55 2-track machine aimed at radio news applications. The MX-50 is a 2-track machine aimed at the lower budget professional market. The MX-5050 BIII 1/4-inch 2-channel. The MX-5050

MKIV-2 1/4-inch 2-channel in a console cabinet. The MKIV-4 1/2-inch 4-channel and The MKIV-8 1/2-inch 8-channel.

UK: Otari Electric (UK) Ltd. Tel: 0753 580777.

Fax: 0753 42600.

USA: Otari Corporation. Tel: +1 415 341 5900.

Fax: +1 415 341 7200.

- **Stellavox:** The TD-9 modular tape recorder offers 1/4-inch, and 1/2-inch tape or 16 mm perfotape operation and headblocks available in 12 different track configurations from mono to 4-track.

Stellavox, Digital Audio Technologies SA.

Tel: 038 244 400.

- **Fostex:** E-2 1/4-inch 2-track. E-22 1/2-inch 2-track. R8 1/4-inch 8-track recorder. G24S is a 1-inch 24-track recorder with Dolby S-Type noise reduction. G16S is the 16-track version of G24S. The G16 1/2-inch 16-track recorder is the successor to the E16.

UK: Fostex UK. Tel: 081 893 5111.

USA: Fostex Corporation of America.

Tel: +1 213 921 1112.

- **Tascam:** ATR-60-16 1-inch format 16-track machine, ATR-60 series includes 1/4-inch, 1/2-inch and centre track time code recorders. ATR-80-24 2-inch recorder. MSR-16 1/2-inch 16-track recorder. MSR-24 1-inch machine is based on the MSR-16 recorder. Tascam have launched a version of the MSR-24 and MSR-16 with Dolby S-type noise reduction called the MSR-24S and MSR-16S. TSR-8 1/2-inch 8-track recorder. The BR-20 series are 2-track recorders in three versions, BR-20N NAB version; BR-20T with centre-track time code. 32/34B 1/4-inch 2-track and 4-track recorders.

UK: TEAC UK Ltd. Tel: 0923 819630.

Fax: 0923 236290.

USA: TEAC America Inc. Tel: +1 213 726 0303.

- **Studer:** A807 1/4-inch 2-track mastering machine with centre-track time code. A812 1/4-inch mastering machine with centre-track time code. A800 multichannel recorders available in 8, 16 and 24-track versions. A810 1/4-inch master recorders with versions and options for video and film production applications. A820 2-track recorders available in 1/4-inch and 1/2-inch versions with centre-track time code. A820 2-inch 24-channel multitrack recorder. A827-24 2-inch multitrack recorder.

UK: Studer UK Ltd. Tel: 081 953 3533.

USA: Studer Revox America. Tel: +1 615 254 5651.

- **Lyrec:** FRED editing tape deck for 1/4-inch tape. FRIDA is a 2-channel 1/4-inch recorder with time code. TR-533 offers 16/24-tracks on 2-inch tape.

UK: Lyrec UK. Tel: 0844 278866.

Fax: 0844 278810.

- **Akai:** MG14D 1/2-inch cassette-based recorder with 12 channels plus control track and sync track.

UK: Akai (UK) LTD. Tel: 081 897 6388.

USA: Akai Professional Products.

Tel: +1 817 336 5114.

- **Studio Magnetics:** SML1216 Mk II budget 16-track, 1/2-inch. AR2400 24-track on 2-inch. AR1600 16-track on 2-inch. Omega 24-track and 32-track machines on 2-inch.

UK: Music Lab Sales. Tel: 071 388 5392.

Fax: 071 388 1953.

- **Revox:** B-77 2-track 1/4-inch recorder. ▶



Sony have launched the PCM-3324S DASH multitrack recorder. Deriving from both the 3348 and new technology, the 3324S offers digital 24-track recording at a price comparable to up-market analogue multitracks. The recorder is available with 13 retrofitted hardware options which means that the machine can be optimised for a given situation. These options include two remote controllers (both with DASH chase), confidence monitoring and expanded time code operation. The 3324S is both lighter and more compact than its predecessors and features a faster transport speed and the ability to stripe tapes at 4 x speed plus built-in diagnostics for easy alignment and maintenance.

PR-99 Mk.II 1/4-inch 2-track.
 UK: Revox UK. Tel: 0635 876969.
 Fax: 0635 72556.
 USA: Studer Revox America. Tel: +1 615 254 5651.

Digital tape recorders

- **Studer:** D820X 2-channel digital mastering recorder for the DASH format. D820-24/48-channel digital multitracks. (Contact information in analogue recorders entry.)
- **Mitsubishi:** X-400 16-channel PD format multitrack. X-880 32-track multitrack in PD format. X-86 and X-86C 2-track mastering recorders. PDX-8620 2-track recorder, 20-bit ready with choice of converter. PDX 882 64-track digital recording system comprising two 32-track recorders, the 882 master and slave machines, and a 64-track autolocator. UK: Mitsubishi Pro-Audio. Tel: 07072 78749. Fax: 07072 78694.
- **Sony:** PCM-3324/33 48-channel DASH recorders. New PCM-3324S DASH recorder with modular interface options and budget price (see box). (Contact information in analogue recorders entry.)
- **Otari:** DTR 900 II 32-track PD format recorder. (Contact information in analogue recorders entry.)
- **TEAC/Tascam:** DA-800 32-track DASH format recorder. (Contact information in analogue recorders entry.)
- **Nagra:** Nagra D is Nagra's own format with rotary-head digital audio on 1/4-inch tape with reel-to-reel. Provides 2 or 4 tracks with 20-bit word length at 48 kHz.
- **Alesis:** ADAT is a S-VHS tape based 8-track

digital recorder. Up to 16 machines are syncable together allowing maximum 128 tracks.
 USA: Alesis Corporation. Tel: +1 213 476 8000. Fax: +1 213 836 9192.
 UK: Sound Technology PLC. Tel: 0462 480 000. Fax: 0462 480 800.
 ● **Akai:** DR1200 12-tracks on 8 mm video cassette which records 12 digital PCM channels. (Contact information in analogue recorders entry.)
 ● **Yamaha:** DRU8 8-track 20-bit digital recorder in a rackmount format that can be added to the DMR8 digital mixer. UK: Yamaha-Kemble Music Ltd. Tel: 0908 71771. USA: Yamaha Corporation of America. Tel: +1 714 5229011.

DAT Players

- **Stellavox:** StellaDat portable DAT recorder with digital time code. (Contact information in analogue recorders entry.)
- **Sony:** PCM-7050, PCM-7030 and 7010 4-head, 4-motor recorders. DTC 1000ES HHB modified to record 44.1kHz and 48 kHz. TCD D10, pro version with balanced inputs. PCM 2500 with digitals I/Os. RSDAT RS1000 with broadcast and theatre applications, with on-air controls. PC-204 portable offers double-speed recording. PCM-2300 professional machine employing 1-bit High-Density Linear-Conversion Pulse D/A, and 1-bit delta-sigma type A/D. HHB have also provided a modification for the PCM-2700 called 2700 PRO providing full AES/EBU interface using balanced XLR connectors. (Contact information in analogue recorders entry.)
- **Fostex:** D-20 is the first DAT that allowed SMPTE time code to be recorded on tape's subcode area. New is the D20B time-code-equipped



Stellavox Stelladat

machine now with chase synchroniser and reduced priced. PD2 designed for mobile or location use. (Contact information in analogue recorders entry.)
 ● **Technics:** SV-3700 designed for broadcast and postproduction facilities. SV-3900 with full remote control via serial control interface, SH-MK360. UK: Raper & Wyman. Tel: 081 800 8288.
 ● **Casio:** DA-7 portable recorder useful for sample recording and archiving. DAR100 portable DAT recorder, SCMS-equipped, ideal for personal use. Casio Electronics Co. Tel: 081 450 9131. Fax: 081 452 6323.

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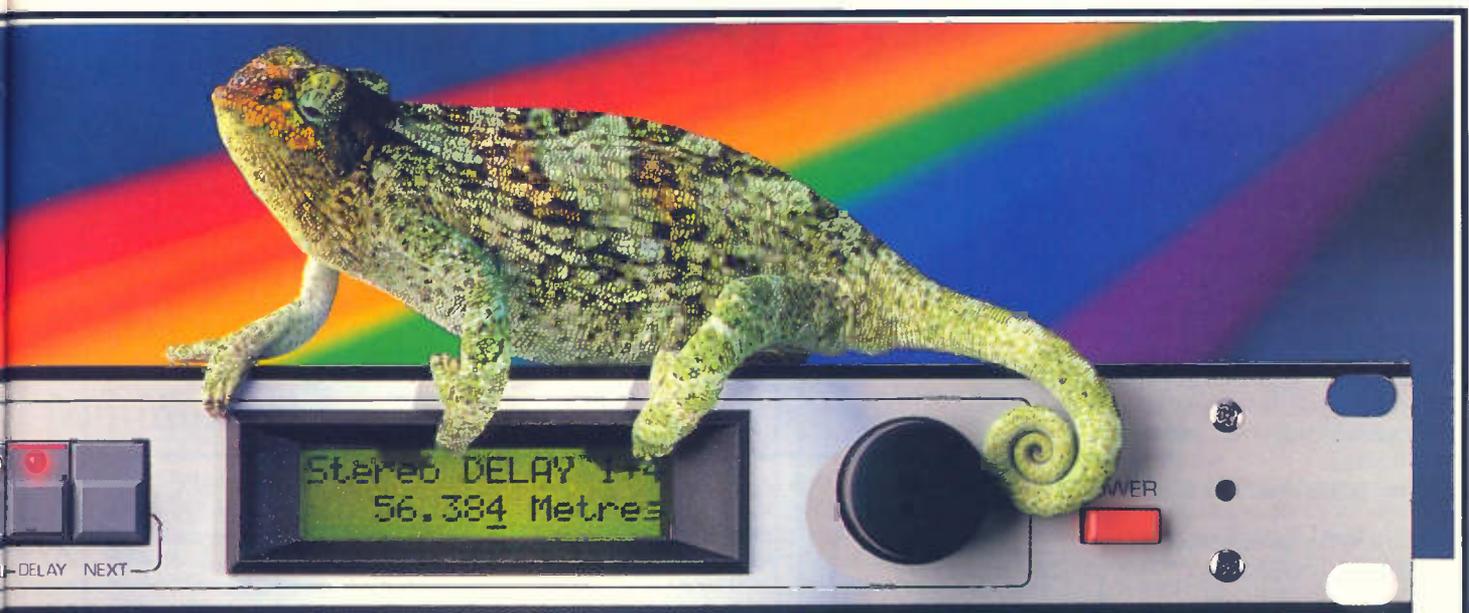
- **Aiwa:** *HD-S1* compact machine with rechargeable battery pack.
Aiwa(UK)Ltd. Tel: 081 897 7000.
Fax: 081 960 1160.
- **UK:** HHB Communications. Tel: 081 960 2144.
Fax: 081 960 1160.
- **USA:** Aiwa American Inc. Tel: +1 201 512 3600.
Fax: +1 201 512 3702
- **TEAC/Tascam:** *DA-30* with 48/44.1 and 32 kHz sampling rates. New is the *DA-60* machine featuring confidence monitoring and time code facilities. From TEAC a new portable DAT recorder the *DA-B20*.
(Contact information in analogue recorders entry.)
- **JVC:** The portable *XPDI PRO* with attached mic which houses the A/D converters. Also range of time code DAT machines now equipped with 9-pin control.
JVC. Tel: 081 450 3282. Fax: 081 452 1593.
USA: JVC Corporation of America.
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- **Otari:** *DTR-7* professional DAT machine. *DTR-90* professional DAT and *CB-149* editor. *DTR-90* uses 4-head configuration and selectable sampling rates for recording. A removable front panel provides remote control for all functions.
(Contact information in analogue recorders entry.)
- **Studer:** The *D780* professional DAT recorder features optional rackmounting, nine definable autolocator addresses plus Last Cue address, auto-cue and a quick-start option for instantaneous play.
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CD makers

- **Apex:** The *CD-R 40* is a derivative of a Philips CDR machine as are most of the current crop of

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Apex NV. Tel: +32 11 272 983.
Fax: +32 11 274 353.
- **UK:** Stirling Audio. Tel: 071 624 6000.
- **Carver:** *PDR-10* CD recorder.
Carver Corporation. Tel: +1 206 775 1202.
UK: AKG. Tel: 0483 425 702. Fax: 0483 428 967.
- **Marantz:** The *CDR-1* features transformer-balanced XLR, unbalanced phono analogue inputs and outputs as well as the standard digital connections.
Marantz Professional. Tel: +31 40 758 881.
Fax: +31 40 758 299.
UK: HHB Communications. Tel: 081 960 2144.
Fax: 081 960 1160.
- **Meridian:** a company known more for their consumer equipment modify the basic Philips machine with an AES/EBU interface, an optional wired-remote facility, anti-jittered digital outputs and switchable SCMS.
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Fax: 0480 432 948.
UK: Canford Audio. Tel: 091 417 0057.
Fax: 091 416 0392.
- **Micromega:** a low-cost machine from this French company distributed and badged in the UK by Audio Design.
Audio & Design Ltd.
Tel: 0734 844545.
Fax: 0734 842604.
- **Mission:** well-known hi-fi equipment manufacturers make their own CD-R machine and

- call it semiprofessional.
Mission Group. Tel: 0480 52777.
Fax: 0480 414774.
- **Studer:** their *D780* offers a number of extras including an AES/EBU I/O, auto-ID registration from a DAT master using the Studer *D780* DAT machine, transformer-balanced analogue connections, switchable calibrated or uncalibrated input levels, track start-end review facilities and, arguably, a more professional button layout.
(Contact information in analogue recorders entry.)
- **Yamaha:** *YPDR-601* offers one significant advantage to the others, namely its Pre-TOC (Table of Contents) facility. The disc is predivided into 30 s track lengths. If you want a three-minute passage, you simply use six tracks for a seamless recording. In this way you can record your three-minute passage, take it away and play it on a standard CD player, and then return the same disc to the CDR machine for further recording. That's the theory anyway.
(Contact information in digital recorders entry.)
- **HHB:** New from UK pro-audio distributor HHB is the *CD-R Indexer* which is an open-ended product, forming the nucleus of a range of devices. Functions presently available include the translation of DAT index points to CD-R track increment flags, allowing the cloning of DAT tracks to CD-R tracks. Also the interconversion of professional and consumer protocols by changing the consumer bit structure.
HHB Communications, 73-75 Scrubs Lane, London NW10 6QU. Tel: 081 960 2144.
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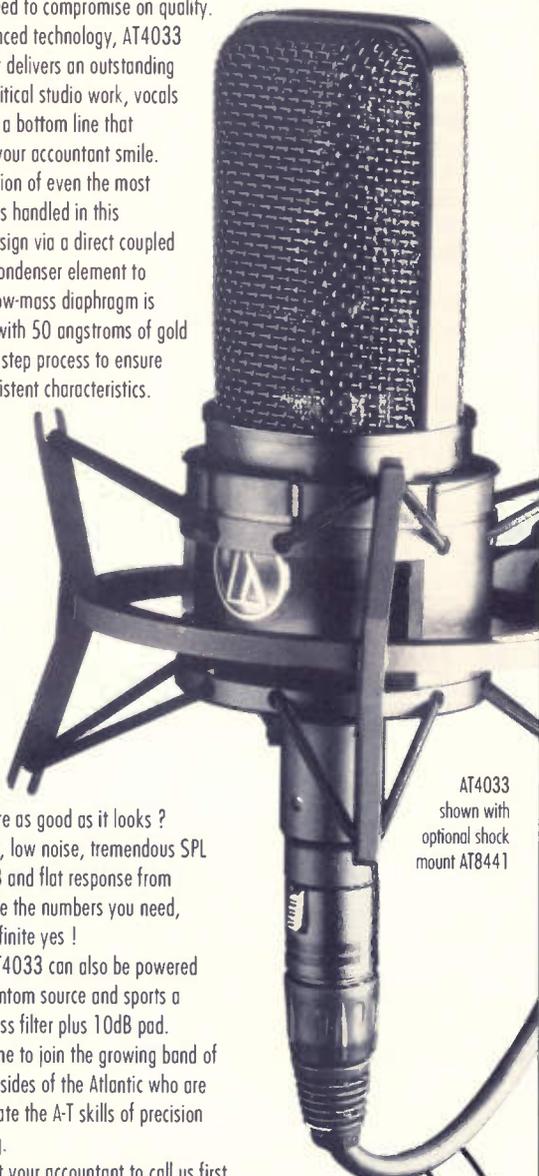
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Many of the items mentioned above are exhibition models.
Offer is not obliging! All items are subject to prior sale!
If you have any questions, please contact Mr Kutsch



Studio A control room. Left to right: bottom left, STC value mixing desk; EMI BTR2 recorder; WIFOS reverb control unit — under shelf; Philips recorder and EMI TR90 recorder

STUDIO OF THE STARS

How many of Radio Luxembourg's four million listeners realised they were listening to programmes recorded in London? Alan Bailey remembers the '50s and '60s, and the early days of commercial broadcasting

Radio Luxembourg started its service to the United Kingdom in October 1933, and instantly incurred the displeasure of the BBC which believed that it alone had the right to determine what British people should hear on their radios. Turning its displeasure into action, the BBC used its influence to prevent Luxembourg from establishing broadcast-quality land line circuits from the UK to its European transmitter site. Since, given the transport facilities of the time, it was clearly impossible to transport artists to and from the Grand Duchy to make their programmes, the only available solution was to record the programmes in London, and ship the recordings by air to Luxembourg for transmission.

Until the war, these recordings were made on huge and heavy 16-inch shellac transcription

discs, each of which played for 15 minutes. By the time I joined the Luxembourg UK staff in 1958, however, these had thankfully been superseded by tape, although the old discs still occasionally turned up as source material for inclusion in filler programmes. Also by this time, the station had adopted a virtually all-music format, such nonmusic shows as *Take Your Pick* and *Double Your Money* were slowly being phased out, having transferred to commercial television when it started up in 1955.

Our job was to record programmes like the *Decca Record Show* which was introduced by Pete Murray, Jack Jackson, Tony Hall and Pat Campbell, and its EMI equivalent which was presented by David Jacobs, Jimmy Young, Ray Orchard and Luxembourg's first female DJ, Muriel Young. Programmes of this type consisted of

records linked by DJ's chat — a format which has set the style for most of today's popular music broadcasting. Because of rapid changes in the popularity of records, the programmes had to be recorded close to the transmission date, and most were aired within one or two days. This meant a fairly hectic production schedule, and it was quite usual to record six 30-minute programmes end-to-end in a single session starting at 9:30 am and finishing at 1:00 pm. In spite of this, however, we never felt that we were under pressure — probably because of the atmosphere of enjoyment and enthusiasm which always pervaded the Luxembourg studios.

Most of the programmes were recorded on EMI BTR2 recorders using single-track 1/4-inch Agfa tape running originally at 30, later at 15, inches per second. There was no electronic editing, of course; we used a chinagraph pencil, razor blade and splicing tape. In spite of these primitive editing facilities, we rarely had to resort to a complete retake, but we did sometimes have to run through the programme and record an insert to cover an unbroadcastable blunder. Even today, I still hold a prized collection of these which I call my Black Museum.

Possibly my worst experience with this equipment occurred when we were taping an EMI record programme with Jimmy Young. The timing was more than usually tight, and it was not until after Jimmy had left the studio that we had the opportunity to check the recording. Somehow, due ▶



Studio A recording area, scene of many 'live' music sessions as well as record shows

to a technical problem, there was no programme to replay! Fortunately, we were recording an outside broadcast at EMI House that evening, and Jimmy was able to come along and rerecord the links. Later, in the studio, we dubbed in the music from records and all was well, but the incident certainly gave me a few uncomfortable hours!

Another outside broadcast demonstrated the robustness of the *BTR2* machines. We frequently used to record the likes of Joe Loss, Ted Heath, Chris Barber and Humphrey Littleton at the Poplar Civic Theatre. To do this we used to take a *BTR2* from the studio, and set it up on location. The machines were huge and heavy — the chassis, I believe was made by Morris Cowley — but as they could be semidismantled for easy transport, this was usually no problem. But, at Poplar Civic Theatre, we had to carry the recorder up a rather awkward flight of stone stairs and, inevitably, one day it overbalanced and we dropped it. To this day, I can see it ouncing down to the bottom. Without much hope — this was valved equipment, remember — we retrieved it and saw at once that the PPM was smashed. Nevertheless, we set it up and, with crossed fingers, switched on. It worked perfectly. We quickly rigged up a temporary external meter, and the session went ahead with no further hitch. I wonder how much of today's equipment would survive such treatment?

The biggest problem with the *BTR2*s was that they took time to run up to speed, which made instant starts impossible. To get round this we later installed EMI *TR90* recorders which had much better tape acceleration. Although these were otherwise excellent machines, they did not completely solve the problem, since they were prone to tape snatch on take up.

One minor quirk in Luxembourg recording practice led to an amusing incident. Probably because of our European connections, our recording tape was wound on single-sided flat-plate hubs rather than on the double-cheek spools normally used in the UK. Keith Fordyce and Don Moss were to discover the disadvantages of the European method when, in transit, a spool

and its tape became separated. It arrived only minutes before it was due to be broadcast. Apparently it was quite a sight to see them running up and down the corridors of Villa Louvigny with hundreds of metres of tape strung between them, desperately trying to respool it in time for transmission!

In spite of the limitations of our famous 208-metre medium wave transmission channel, we always aimed to produce recordings of the highest possible technical quality. For example, a previous chief engineer modified the *BTR2* recorders so that their frequency response was flat within 2 dB to 20 kHz. It is some indication of the quality we

achieved that, during the 1970s, we were frequently asked by our old sparring partner, the BBC, to produce recordings for inclusion in their own programmes. Naturally, our requirement for quality meant paying careful attention to the selection of studio equipment.

The microphones we used originally were the well-known *STC 4033* cardioid, *4038* ribbon and the *4021* moving-coil ball-and-biscuit type, but we later upgraded to Neumann *U67* and *U87* condenser microphones for general use. *STC* ribbon units were used on instruments such as trumpets and trombones. These microphones gave a smooth, rich performance which, I believe, is unmatched even today, although modern mics are, of course, much quieter in operation.

Records featured heavily in our programmes, so it was particularly important for us to have the best possible reproducing equipment. The choice of turntable was easy — nothing came close to the Garrard *301* in terms of performance and reliability — and our choice of arm was dictated by the need to be able to play the old 16-inch transcription discs. Pick-ups were another matter. When I first joined Luxembourg, we were using *Acos Black Shadow* crystal units. The record company sponsors, however, used to review copies of their programme tapes from time to time, and we had a comment from a Decca senior engineer that we were not doing full justice to the quality of their latest records. In response, we changed to Goldring *Vari-luctance* pick-ups and received no more complaints. I have often wondered whether, with the restricted bandwidth of our medium-wave channel, the listeners could hear any difference, but it is important to keep the sponsor happy.

During my time at Luxembourg, all new discs were being issued on vinyl but, particularly for request programmes, we often had to use older shellac 78 rpm records. These gave rise to a small problem which is probably unknown to most of today's studio engineers. Because of their weight and comparatively high playing speed, such discs are difficult to cue accurately. Certainly, you can line up the pick-up at the appropriate point, but when you release the disc, it slips dramatically on the turntable mat. So, to spin in a 78 on cue was ▶



David Jacobs editing in Studio B. Note the single cheek or 'Plate' take-up spool

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an art all on its own, especially when trying to cut the intro and start on vocals.

Shellac records did have another rather unusual and very enjoyable use, however. For many years, Bob Monkhouse and Dennis Goodwin presented a Luxembourg show called *Smash Hits*. The interpretation of the show's title was rather more literal than might be expected, because listeners were invited to write in saying why they would like never to hear a particular record again. The reasons given ranged from humorous to almost tragic. After reading the letter on air, Bob and Dennis played the record one last time and then, in theory at least, smashed it. This meant we needed a good selection of record-smashing sound effects, and how better to make them than by smashing records? Periodically, we used to purge our record library, and smash the surplus 78s on the edge of a formica-topped table in the studio. Believe me, there has never been a better way of relieving the tensions of a busy day's recording.

My time with Radio Luxembourg coincided with what I, and I am sure many others, consider to be



The late Cyril Stapleton with the author in Studio A control room during an audition

one of the most exciting and interesting periods in the development of UK pop music. I was fortunate enough to work with almost all of the recording stars of the '60s and '70s, many of whom are still prominent in show business to this day.

I well remember one audition which I recorded for Decca, when they were looking for a presenter to launch the new Warner Brothers label. The subject walked into the studio and made an instant impression — but then brightly coloured chequer-patterned hair was something of a novelty even in 1962. The dance floor manager of the Locarno Ballroom in Leeds, one Jimmy Saville, gave an audition which was different from anything we had seen or heard before, but none of us doubted his talent, and we immediately knew that he would be successful.

A more melancholy recollection relates to an unlikely Luxembourg personality of the same period, boxer Freddie Mills. Freddie had his own record show, which he recorded at our studios. I simply could not believe it when, the day after one of these sessions, during which we had been chatting and joking as usual, I picked up my newspaper to read that Freddie had died of gunshot wounds. An engineer's life at Luxembourg was certainly never dull.

Our engineering team in the 1960s prided themselves in being able to spot the acts which were going to make it but I was, on one occasion, incredibly wrong. One day early in 1962, we recorded a Friday Night Spectacular at EMI House in Manchester Square in front of an invited audience. Among the featured groups were The Beatles, and I have a clear recollection of Paul miming to the record by 'playing' the harmonica with his right ear. My opinion was that they had no chance of success. Within a month, they had become the hottest group in the pop world, and the rest is history. At least I could console myself that I was not the only one to get it wrong.

Luxembourg was without doubt, the European forerunner of the all-music programme format which has been almost universally adopted by present day local radio stations. Working for the station was always fascinating and enjoyable, and I, for one, was saddened by the closure of the medium-wave English-language service in December of last year. The station has not entirely disappeared, it continues to broadcast via the Astra satellite and on short wave to North America, but this residual service is a far cry from the days when it used to command a nightly UK audience of millions. Nevertheless, Luxembourg's English language service revolutionised the face of UK broadcasting and the legacy of those who worked at the station's Studio of the Stars in Hertford Street, Mayfair will be with us for a very long time. ■

Alan Bailey, now Production Manager at Radio Trent, worked at Radio Luxembourg from 1958 until 1975, ultimately becoming the London's office's Chief Engineer and Producer.



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"Although we originally bought our SoundStation for dialogue editing," says Bill Varney, "...before long, editors were using it just as often for music and effects." Satisfied clients have been keeping the SoundStation room busy 16 hours a day. No wonder Bill and Doc have just installed an additional SoundStation at Universal.

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The Jean-Michel Jarre spectacular at La Defense in Paris

Looking through trade magazines and journals, one might almost be forgiven for thinking that in the field of sound reinforcement, once past the major companies in the USA and United Kingdom, there is not too much going on.

This, however, would be a very limited viewpoint and Europe does boast some sound reinforcement companies of considerable size and distinction, among these, Dispatch from France.

Over the years, Dispatch have grown to be by far the largest hire company in France and handle virtually all of the major French artists for their concerts and tours. Their sphere of influence has also made itself felt in the expanding market of multimedia presentations (or 'industrials', as our US friends say) as well as in equipment sales.

Dispatch can be considered to have started life in 1983 and the four founder members in the persons of Eric Alvergnat, Gerard Trevignon, Olivier Croguennec and Denis Pinchedez, are still very active in the organisation.

The second really important date in the career of the company is 1988, which saw the amalgamation of Dispatch with STC, an innovative sound company that was making a name for itself but really lacked the heavyweight finance to make a significant leap forward. This move brought Patrice Cramer, Olivier Croguennec, François Maze and Marc de Fouquieres into the fold and the combined forces led to a powerful organisation which included some of top live sound engineers —

DISPATCH CASE

Dispatch have grown to be the largest hire company in France. Terry Nelson reports

both for mixing and for systems and development — in France and confirmed Dispatch as the premiere hire company in the Hexagon (as France is often known as by the French).

The company now has four separate divisions, which are supervised by the overall Dispatch Organisation and managed by Eric Alvergnat. The areas covered are: 1, concerts, special events and TV spectaculars run by M. Alvergnat's three partners together with Olivier Croguennec and François Maze; 2, Dispatch technique, which deals with systems development, loudspeaker design, etc. and is looked after by Marc de Fouquieres; 3, Dispatch maintenance organised by Joel Lecann and François Rebillard; 4, Best Audio, which deals with equipment sales and fixed installations.

Best Audio can supply all makes of equipment according to requirements, however, Dispatch are

also the exclusive importer and distributor for Meyer Sound products.

The client base for Dispatch is essentially francophone (or french-speaking) though the company does go over the border into Switzerland and Belgium from time to time, notably for such annual festivals as Nyon and Leysin or events such as the Eurovision Song Contest. The company is also starting to have a greater participation in the Montreux Jazz Festival.

Rather than being based around an in-house system, Dispatch use Meyer and SCV 246 Compact loudspeakers. Gerard Trevignon and Marc de Fouquieres explained the background to this decision.

'At the moment, it would be too costly in time and investment costs to develop our own system. However, this does not rule out any movement in



Left: team leader, Denis Pinchedez, second from right, with the Classical Division Dispatch crew at the screening of Abel Gance's *Napoleon* in Lausanne, Switzerland

Above left: the monitor console and control racks at the Leysin Festival, Switzerland

Above right: Gerard Trevignon, left, and Olivier Croguennec, right, at the Leysin Festival, Switzerland

Below: another moment from the Jean-Michel Jarre show at La Defense



this direction for the future.

'The Meyer and SCV boxes work very well for us at the moment.'

In fact, the SCV 246 full-range system can almost be considered as a Dispatch in-house system as they worked very closely with SCV in establishing the design.

It is also worth noting that the original STC 'building block' system is still in use. However, further development on this was stopped when the original speaker components — upon which the design was based — became unavailable.

Dispatch are now situated in the new industrial area north of Paris (ZI Nord), which offers excellent access and space to move.

The building features a large reception area leading through to the ground floor storage and service areas, complete with two loading docks for trucks, and a first floor open-plan office. The office can be either accessed via the main entrance or the workshops.

The situation also means that many industrial and shopping services are close at hand, together with several establishments dedicated to upholding one of the noblest French traditions, the lunch hour (or two).

Gerard Trevignon elaborated on the company philosophy. 'One of the things that has to be remembered, for a company like Dispatch, is that we are in France. This means that the market, while it is good to us, is still smaller than that serviced by the American and British companies.

'I would say that we are in the position where we have to follow the market and its demands rather than working the other way round. We are not really in a position as yet to initiate trends so we have to provide the services and equipment that are demanded by the client...'

One of the main topics of conversation in the political and business world at present is the EEC, which will effectively come into force in 1993.

I asked Dispatch how they felt this would affect their market.

'As a first impression I do not think it will make much difference to us. However, it is possible that conditions will be even more favourable for outside companies, which might seem a little strange.

'I think we have to bear in mind that before there will be any significant economic development in our business sector, there will first have to be a cultural development. Just because it will be easy to move around Europe in order to work, does not mean that German or Italian companies are suddenly going to make inroads on the French market. First of all, they are not very well known and secondly, there are the cultural differences with the programme material.

'The moment we start getting a "European Music", then things will start hotting up as a European market starts to develop.'

The cultural difference that Gerard mentioned has a distinct bearing on rock music, which it has to be admitted, is still mainly the province of the Anglo-Saxons.

'An international tour of rock bands and/or artists can in virtually all cases, be considered as starting out from England or from the States. This means that it is almost certain that they will be using hire companies from one of the two countries so we would not be in the running from the start.'

It should also be noted that, because of the aura surrounding the English and American companies, there are times when major French artists will hire their services (for example Johnny Hallyday has used Clair Brothers in the past) in an attempt to be more 'authentic' where rock is concerned.

We went on to talk about the major differences between the US and French companies. ▶



Ray Furse, right, guest engineer on the Pixies set at the Leysin Festival

I would say that there are two main areas of comparison: costs and opportunities.

Starting with cost factors, the Americans have advantages both in equipment and personnel wages. The equipment is cheaper because it is either "Made in the USA" or in a highly competitive market. The same equipment, once it is in France, is considerably more expensive due to freight, taxes, dealer mark-up, etc.

When you start to deal in large quantities, this obviously makes quite a difference.

With personnel costs, it is a disadvantage being in France.

Most people from outside the country often do not realise the very high social charges that an employer has to pay for each employee.

For example, someone who is paid 1000 ff per day will in fact cost the employer almost double. This all has to be passed on to the customer if the company is to stay in business.

A similar situation exists concerning opportunities: there are obviously far more outlets in the States for a hire company than in Europe. The country is bigger, which means a bigger market due to the fact there is a lot more going on and there are no international frontiers between the states.

This brings us back to the cultural differences in Europe that we touched on earlier when comparing it with the US.

This said, Dispatch do cover a wide range of activities, including some very large events.

These range from concerts of all types, political meetings (which in France gives a lot of entertainment), theatre shows, festivals, multimedia events, product launches and international spectaculars such as Jean-Michel

Jarre at La Defense, Paris or the huge theatrical presentation sponsored by the French government in India several years ago.

A more recent activity is the fixed installation, which shows a move into the contractor market.

In this case, it was the customers who came to us. They were looking for a company to specify and install a sound system and our reputation played the role of marketing.

The customers in this instance are the Palais Omnisport at Bercy and the Parc des Princes (both in Paris).

The installation at Bercy includes 16 MSL3s, 16 UPA1s and 8 subwoofers.

The Parc des Princes is very recent and came on line during February this year. At the time of my visit to the Dispatch headquarters, Marc de Fouquieres and his team were in the process of finishing off a special test and display system which allows the individual or group testing of the 128 UPA speakers that have been installed.

Surprisingly enough, Dispatch do not do many large festivals, though one of their annual jaunts includes the Leysin and Nyon festivals in Switzerland.

The more recent of the two, the Leysin Festival has grown considerably in importance and presents a mixture of top international acts, both French and Anglo-Saxon.

Situated at an altitude of about 1200 metres, the Leysin Festival is set in the Swiss Alps and the site is almost a natural amphitheatre, meaning that for once the sound can work with the surroundings rather than in spite of them.

The system for 1991 included left and right stacks of 14 MSL3s stacked in 2 tiers of 7 plus 4 UPA1s for front fill and subwoofers. The stage

monitoring was drawn from over 30 UM1s and sidefills of 650s and UPA1s. A delay system for rear fill consisted of UPA1s fixed to the sides of the mixing tower.

All consoles were Soundcraft Series 4, two for monitors and two for FOH, in order to speed up changeovers.

How did Gerard and Olivier feel about the festival situation?

It is always interesting to see how other people work and what they can do with the system. Depending on the acts, we will take it in turns to either mix or just give a helping hand.

The thorny problem of the competence of 'guest engineers' was touched upon.

This can vary an awful lot: from excellent to someone who really has no experience of a large system at all.

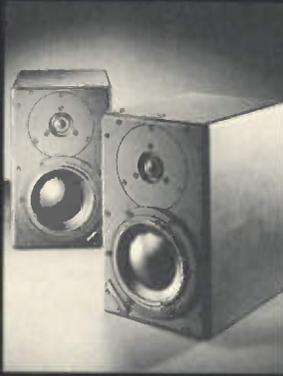
The question of communication also plays a large role. We often find that people either do not know what they want or, for reasons of ego, are afraid to ask for fear that they will look as if they do not know what they are doing.

Of course, the more experienced an engineer is, the more he knows that you cannot just walk into a completely unknown system and expect to have it down straight away. They also have a pretty good idea of what they require and will come straight out and ask for it — no problem. It is the inexperienced or untalented people that cause the most difficulty by not availing themselves of the help available, which in turn can lead to a situation where everyone suffers — including the sound and thus the audience (not to mention the reputation of the company).

We also find ourselves getting into disagreements at times with engineers who ▶

No Artificial Colouring

PPM1



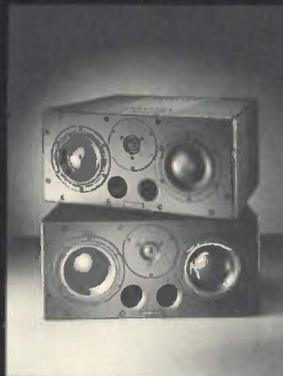
H 273 W 170 D 230 (mm)
114 dB, 60Hz - 20kHz
Broadcast/Music
Reference Monitor

PPM2



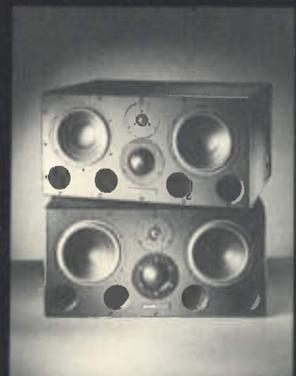
H 333 W 205 D 278 (mm)
117 dB, 50 Hz - 20 kHz
All applications
Nearfield Monitor

M1



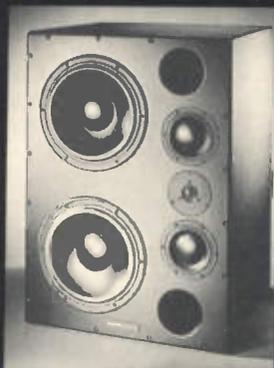
H 210 W 450 D 310 (mm)
122 dB, 50 Hz - 20 kHz
Console Top Music
Nearfield Main Monitor

M2



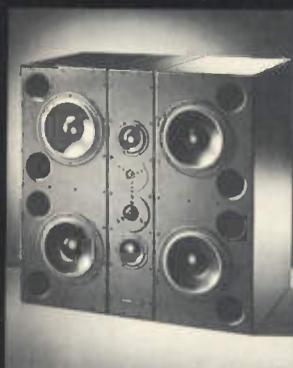
H 340 W 680 D 500 (mm)
125 dB, 45 Hz - 20 kHz
Film/Broadcast/Music
Midfield Main Monitor

M3



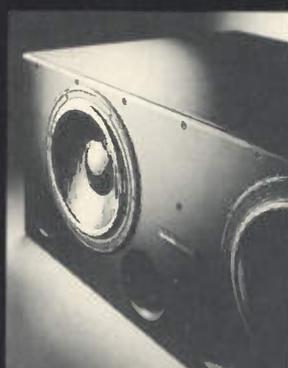
H 775 W 555 D 505 (mm)
123dB, 40 Hz - 20 kHz
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contest the use of limiters on the main programme feed.

'There are loud acts where the mix engineer can handle it without overdriving the system but there are also the cases where "its loud enough when it distorts". We set the system up for optimum performance and make it the rule for everybody

— that way its the same system. If the previous act sounded good then there is no reason why the next one shouldn't.'

Another point that has to be considered is that Noise Control legislation in Europe is starting to cut some quite sharp teeth and often the organiser will be held legally responsible for going over the limits.

During the course of the festival, I noticed quite a brisk traffic in outside consoles and control racks.

'If people want to bring in their own consoles or effects — no problem. In fact, if acts have very

sophisticated setups we even advise it as the festival situation calls for quick changeovers without too much hassle — a point that some people find hard to deal with.'

On the technology forefront, Dispatch have been the first PA company in the world to use a completely automated console, the *Saje Memory*. Considering their experience in this field, surely the *Memory* would be ideal for festivals?

'At first glance, it is ideal. One console that can completely memorise every setup. However, we have found that the majority of engineers can't really produce so, an engineer telling us what he wants while we set up the console is not for today. In festival situations people are nervous enough as it is and there is still a certain resistance to a computerised console.

'On the other side of the coin, we have now done many tours with the *Memory* — both for FOH and monitors — and most of the engineers want nothing else!

'The main drawback at the moment of the console is the price. For large theatres and broadcast organisations there is usually more budget available to have the right equipment for the job. Sound reinforcement companies, however, are up against intense bidding and keeping costs down as much as possible.

'For the moment, we rent *Memory* consoles when they are specifically demanded by the artist, who in this situation is putting performance before price. It is a start, after all, and bodes well for the future.'

Another aspect of Dispatch's activities that ought to be touched upon is the classical division.

This has been in existence for about five years and predates the recent vogue in reinforced classical music.

The responsibility of Denis Pinchedez, this specialised sector has dealt with a variety of events and musical formations and well understands the difference between reinforcement and amplification.

'It all depends on the formation — orchestra, string quartet, chamber orchestra, etc — and the venue, whether it be indoors or open air.

'The idea of reinforcing the sound is just that! To carry the performance into a wider audience, and possibly under difficult conditions, without detracting from the original sound. The only time that the audience should be aware that it is reinforced is when you turn off and let them compare the difference! However, that is hopefully restricted to rehearsals.'

As Europe stands poised on the brink of a much-publicised 1993, it will be interesting to see how an integrated European market for sound reinforcement companies will develop.

Depending probably on cultural barriers breaking down to a certain extent, things will almost certainly not happen overnight. However, it is equally certain that Dispatch will be helping to break down the barricades.

Allons, enfants de la... ■ Terry Nelson

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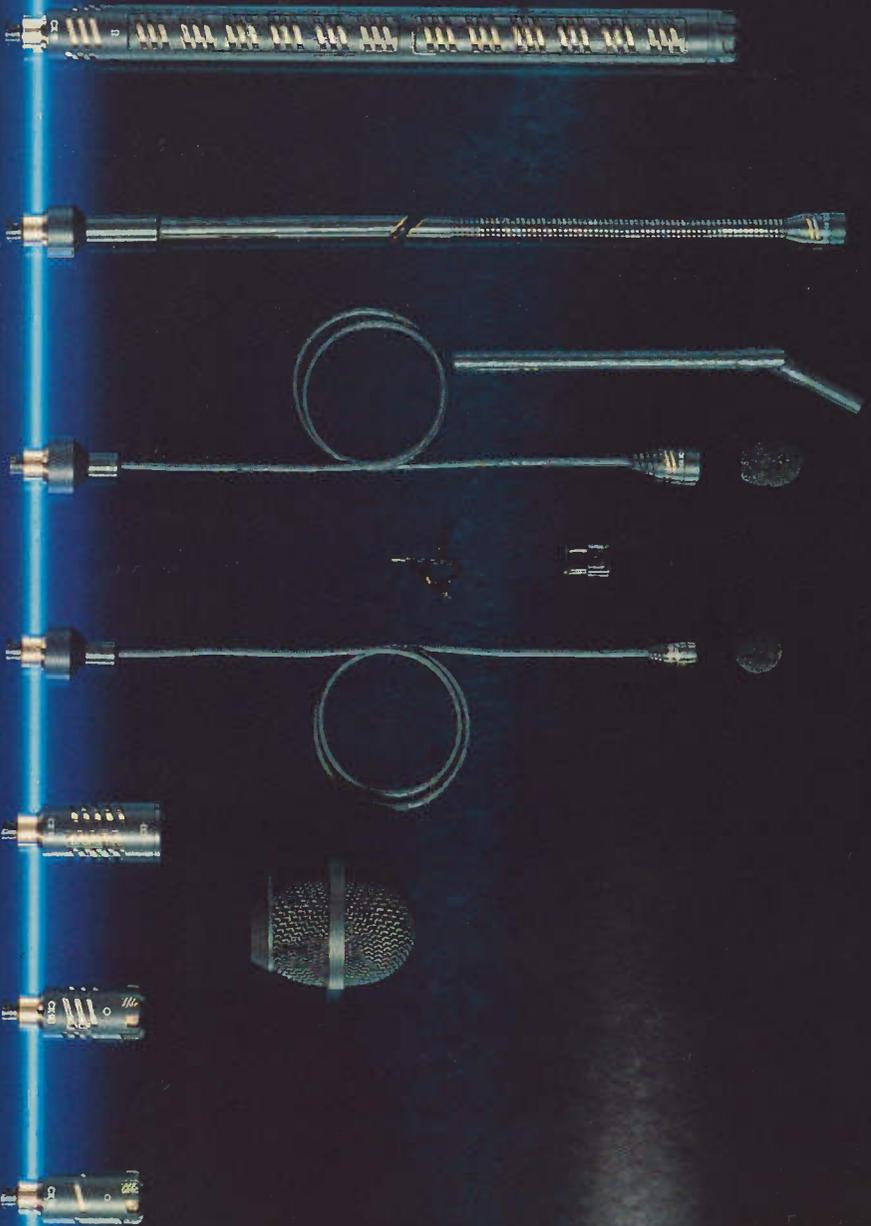
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COUNTRYLANE

Terry Nelson visits a studio near Munich, Germany that integrates vintage and digital recording equipment

Countrylane Recording Studios was last visited by *Studio Sound* in 1987, when the extensive MIDI system of the studio was featured as probably being one of the most advanced in Europe.

Five years later on, and after considerable rebuilding, Countrylane are now ready to open Key One, their second studio, to the professional market, together with a small video studio.

Studio owner and engineer, Harry Thumann, is carrying on the old tradition of building in-house systems customised to the particular needs of the studio and if a particular piece is not readily available on the market, then it will be designed and made.

However, there is nothing old-fashioned about the new Musicworks (as the studios are also called) and apart from doing some upgrading of the main studio control room, Thumann has been spending the best part of the last two years building the new control room for what is now known as Studio B, or Key 1, and installing the highly customised system that fits into it.

'What I was looking for was a marriage of old and new technology, that would be in the form of analogue signal paths providing the highest quality for digital recording and then to stay in the digital format for mixing and processing.'

The 'old and the new' in this case means Neve Class 'A' console modules and 16/20-bit digital, in what must be a quite unique studio setup.

Going into more detail, this means a custom-built V-shaped frame housing modules from an old BBC Neve console, which routes to a pair of Sony 3324 digital multitracks, and 8 Yamaha DMP7D digital mixers plus SPX1000 and DEQ7 processors for mixdown (plus a ninth Yamaha in a wall rack).

The actual mixing process is controlled via a sophisticated in-house system based on Atari Mega computers and provides dynamic automation of ALL parameters (including moving fader level control), extensive grouping facilities and effects changes, together with the advantage of staying in the digital domain from multitrack to master.

Why DMP7Ds?

Though there is a price, and space, consideration, the fact of the matter is that the Yamaha is capable of 16/20-bit operation without any trouble, something that even the Yamaha people are not too aware of! To be more precise, the Yamaha are working on 16-bit data (DASH format) inputs and using 20-bit internally.

'The basic philosophy was to take DMP7Ds and use them with a Master Controller so that operation would be very similar to a standard automated mixer.'

The obvious question, or comment, is that surely the Yamaha is primarily intended to be a small console for MIDI setups?

The 'D' version of the DMP7 is intended for studio work where signals are to be kept in the digital domain. However, as I just mentioned, the console is capable of a lot more than people think it is and I have had to do a lot of pushing with Yamaha, both in Germany and Japan, in order to get the software updated!

'I think we started out with version 1.b, or something, and we are already up to version 1.d of the software but there are still some bugs that have to be ironed out.'

'It is always annoying to be told that one is using equipment in a way for which it was not designed when it is perfectly capable

of doing the job! Maybe this is one of the problems with software-driven equipment: not enough time is taken in fully investigating all the possibilities before bringing out yet another new product. However, I have no intention of letting things slide!'

(It is perhaps worth noting in passing that many landmark recordings in the past were the result of equipment being used in a way for which it was 'not intended').

Countrylane are situated in a quiet residential quarter of



Germering, a fast-developing town in the Munich area. The studios themselves are in a purpose-built house which now contains Studio A (the main studio), Studio B or Key 1, a small video studio and a projected MIDI suite.

Countrylane have always been at the forefront of trends, rather than following them, and featured the first SSL 4000B console, followed by the integrated MIDI-studio system and now the Key 1 analogue-digital system.

Studio B consists of a control room, a separate machine room housing two Sony 3324 machines and a small lobby area which also manages to provide a home for a Studer A80 24-track and any video machines which may be required for a session.

The control room has been built in a space that was once a drawing room (in the days when the house contained both the studio and living accommodation) and takes advantage of daylight along one wall and a central fireplace which is sited between the main monitors.

The acoustical design reflects a mix of Harry Thumann's own ideas plus influences from Sandy Brown (who designed Studio A originally) and conversations with Sam Toyoshima.

'The room was half designed on paper and then completed during construction. I had the basic principles down and it was then a question of adjusting things as we went along.'

The surface treatment consists of absorbent and reflective areas, the former being covered with fabric and the latter generally being glass — which tends to make the room feel larger than it really is.

The overall decor is white with a light grey monitor wall and blue speckle carpet.

The main monitoring is JBL 4350B s bi-amped by Amcron PSA-2 amplifiers, with Westlakes for nearfields.

'The JBL's have had a considerable amount of work done on them, such as having the bass drivers reconed with the latest versions from JBL and this has made a considerable improvement. Each component has also been checked for phase and the crossover network 'tuned up' for optimum performance.'

'The speakers have also been quad-wired for maximum

efficiency and response — it really does make a difference.'

Listening tests showed that the sound was very accurate and the fact that the listening position is quite close, makes them more like 'super close monitors.'

The system is also capable of quad — or discrete 4-channel mixing and the rear monitors are Tannoy *Series 90 EII*.

The rear wall houses a wide selection of MIDI modules, synthesisers, ancillary equipment, together with a range of different keyboards being mounted in pull-out drawers to the side. There is also a selection of DAT and cassette recorders.

We talked a bit more about the acoustics.

It could be said that the room looks a bit simple but all the angles have been carefully arrived at. Another feature is that the room is in fact a tuned resonator in itself for the bass frequencies. The rear wall consists of a labyrinth construction which ports into the rest area beside the control room — it works really well and provides a very solid bass response by venting out pressure build up from the low frequencies.'

So on to the system itself.

The customised console

The centrepiece, and heart, of the Studio B control room is the V-shaped custom console, which could easily find a role as a control station in a science-fiction-spacecraft script.

'I always did like the wraparound concept of consoles as pioneered by Dick Swettenham with the Helios desks. They are so much more ergonomic.'

The system divides almost equally into analogue and digital sections and we can start with the analogue section first. The recording console is basically a repackaged ex-BBC Television audio desk and features 44 channels (22 in each wing) of 3104, 3705, 3706A, preamp, aux send and routing modules plus 8 channels of 3405A, 3705, 3707 modules. Other modules include 3201 auxiliary returns and 2254G compressors.

The analogue outputs of tracks 1 to 22 from the two digital multitracks are normalised to the line inputs of channels — 44, with tracks 23 and 24 being sent directly to a custom



Harry Thumann seated in Studio B control room

routing matrix for the subgroups and main buses.

The console also contains 56-channel faders.

'Being a BBC console, the faders were "upside down" (hence the expression of pulling up the faders) so I had to turn them round!'

The output routing consists of direct outputs from each channel, eight stereo groups, eight mono subgroups, main quad and left-right buses plus separate mono bus. The auxiliary sends are configured as four echo (effects), two foldback and PA, making seven in all. However, the takeoff points are not fixed and the auxes can be selected to pre or post fader as required.

The system is completed with a very comprehensive patchbay and a custom master control section for soloing, muting, etc., of ►



The customised BBC console in Studio B control room

which more later.

Moving on to the digital part of the system, each wing houses three Yamaha *DMP7D* consoles (providing 24 channels) which then mix down to a fourth submaster *DMP7D*. A ninth *DMP7D* mounted in a wall rack acts as what is called the Master Output Buffer.

The digital outputs of each *3324* are connected to the Yamaha mixers — eight racks per mixer. In addition, each *DMP7D* has a dedicated Yamaha *SPX1000* effects unit connected via the digital effects send and return loop.

Analogue insert points are also available on the patchbay.

The six stereo mixes are then routed as independent outputs as well as going to the respective *DMP7D* submixer. The outputs



Studio B

of the submixers are then available as the four quad buses or, alternatively, the 'quad' mix is then sent to the master mixer or Master Output Buffer, for the final stereo mix.

The stereo signal then goes directly to the Panasonic *3700* DAT master recorder (DAT 1) and simultaneously to one of the Sony multitracks.

In addition, the stereo mix is routed through a Yamaha *FMC1* Format Converter to be either AES/EBU or SDIF before being routed through a digital EQ selector and out to two additional DAT recorders (DAT 2 & 3).

For monitoring and remastering purposes, there is a digital monitoring and remastering selector which selects the stereo mix from the console or the outputs from the three DAT recorders and a reference CD player.

The monitor and EQ selectors are also connected digitally to a Roland *E-660* digital parametric equaliser.

Other facilities include a remastering mode where a stereo signal can be routed back into the main system and a main 18-bit DAC for analogue outputs of the stereo signal.

This completes the main digital-digital signal path for mixing and mastering and we can start to go into more detail.

Referring to the block layout, there are three connections — A B C — that require a little more explanation.

The A signal path is a software-controlled digital link that has been introduced in order to provide special mixing effects and connects the digital outputs of *SPX1000* number 3 (*DMP7D* for channels 17 to 24) to the digital inputs of a Yamaha *DEQ7* digital equaliser-delay unit, the output of which is then routed into the submixer section.

The B signal path is a SPDIF standard direct digital link between the stereo master mixer and the master DAT recorder. The level is identical to that of the main stereo output which also usually feeds one of the two digital multitracks. Level metering is indicated on the console's main meter bridge.

The main advantage of this is that you can run your mix down to the master DAT machine while at the same time making digital copies via the monitor selector section.

'Also, by putting the final mix on one of the multitracks, you have it instantly available as a reference if you have to go back and do a remix for any reason.'

The C signal path is a MIDI-controlled link between the two subgroup mixers. In stereo mode this allows an additional *SPX1000* to be inserted as a master processor (for example compressor-limited) for all subgroups.

(You just have to make sure that the setting of the Master Output Buffer via MIDI is adequate.)

The system features comprehensive patching for special configurations and for easy bouncing and copying between the two Sony multitracks.

The six premixers and submix section have analogue insert points and analogue processors fitted into the console mainframe (apart from the Neve compressors) consist of a pair of Drawmer *201* dual gates for each wing.

The console has been designed so that it can be used in a 24 + 24 configuration, that is one side is used for monitoring and mixing and/or bounce operations can be performed on either side (what is known as 'Split Mode').

The system is centrally controlled by two Atari *Mega* computers running on C-Lab *Creator* and *Notator* plus specially written in-house software. Mouse pads or dedicated controls are used to access the computer for most operations. However, the two keyboards are sunk into each wing next to the fader blocks and covered with removable perspex panels.

The master section, situated in the top of the 'V', contains the main and group faders, four *RTC-1* remote controllers addressable to each of the digital mixers, Yamaha *MPC-1* MIDI controller for selecting MIDI routing and various master controllers.

Turning back briefly to the analogue section, it will be remembered that there are eight subgroups. The faders for these subgroups can either act as the group faders or as eight digital subgroup faders or fully assignable digital controllers.

When in controller mode, each fader can have several control functions (up to eight), namely data control, via the fader and switching via the end-stop switch.

The channels to be routed to the digital controllers are selected by the modified *MPC-1* via MIDI. This selects channels, groups and stereo groups.

Next to the *MPC-1* is a group of central assignable controls, consisting of a linear fader (which can be assigned to a channel or group), four rotary controls Aux 1-2-3 and Pan which can be assigned to the auxiliary sends and pan controls of each *DMP7D* and push buttons for programming mutes, punch-in and punch-out and different switching functions such as EQ on-off or channel on-off.

Above this set of controls is a stereo linear-fader switch panel, described as an 'Intelligent Master Stereo Fader', which as well as being the stereo master, uses either side of the fader and the end-stop switches as data controllers.

Next to the master fader are a set of push buttons (Fig.1) and a digital readout for values. These push buttons select the two CPUs (Atari computers), assign MIDI channels, resolution of



Studio A control room with SSL 4023B console

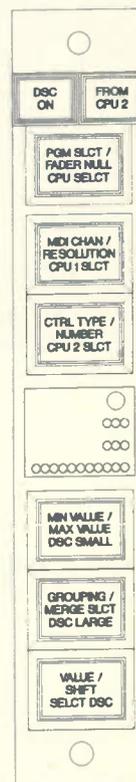
faders, programming parameters, grouping, assignment to small or large faders, MIDI merge functions and type of control signal, for example from DMP7D or MIDI note on-note off.

Without going into a full instruction manual on the system, the master section can handle all solo, mute and modify functions for all channels via assignable controls.

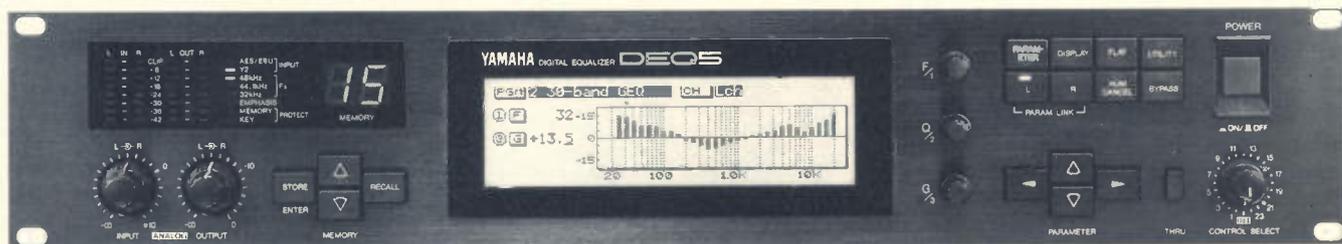
Similarly, the automation not only allows level and switching functions to be automated, but allows total automation of EQ changes, effects changes, etc. Storage is via 3.5-inch floppy disks and hard disk.

This is very much a "Mix-as-you-Record" system. The system gives me all of the facilities of a very expensive digital system ▶

Below. Fig.1: push-button panel situated next to the 'Intelligent Master Stereo Fader'



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The video studio can operate independently

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Studio B features a comprehensive array of MIDI instruments and equipment and this is all integrated into the main system.

Studio A

'One of the driving forces behind the studio was to be able to have my own "composer studio" and leave Studio A free for the main activities of the studio.

'However, the room is, of course, available commercially and is very much orientated towards composers.

'It is also ideal for adding vocal overdubs to projects where most of the tracking and-or mixing has been done already.

'Studio A is linked through to Studio B and we will be installing a *DMP7D* in the SSL in the control room which can act as a master controller for the Key 1 System. Anything is possible!

Moving upstairs to Studio A, the control has been renovated and though it retains the same basic design, is now a lot roomier 'especially as all of the MIDI gear has been taken out'.

The bulk of the outboard gear is now housed in two rolling racks which can be dressed back against the rear walls or pulled

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out to the console, with the rest being in wall racks or in the console frame.

The SSL 4032B console has been kept finely-tuned and it is interesting to note that the layout and some of the facilities of the 'B' are more ergonomic than the later models.

Thumann mused that 'in those days we were looking for what was really the best, rather than worrying too much about price.

'The moment a product like a console becomes successful, you often have to look at the best way to mass produce so you buy cheaper components.' (Otherwise known as the new improved model!)

The JBL 4350 monitors have had the same 'tune-up' as the Studio B system and the response of the control room has certainly been much improved — as an extensive listening session confirmed.

Coming on line almost concurrently with Studio B is the video studio next to it and, indeed, the video side can almost be considered an extension of the studio's capabilities.

The video studio features two-camera operation with Sony U-Matics, For-A time-base corrector, JVC video mixer, Sony video editor and monitors.

'The studio is equipped with blue screens so you could shoot sequences of a video while doing the vocals — full video sync!'

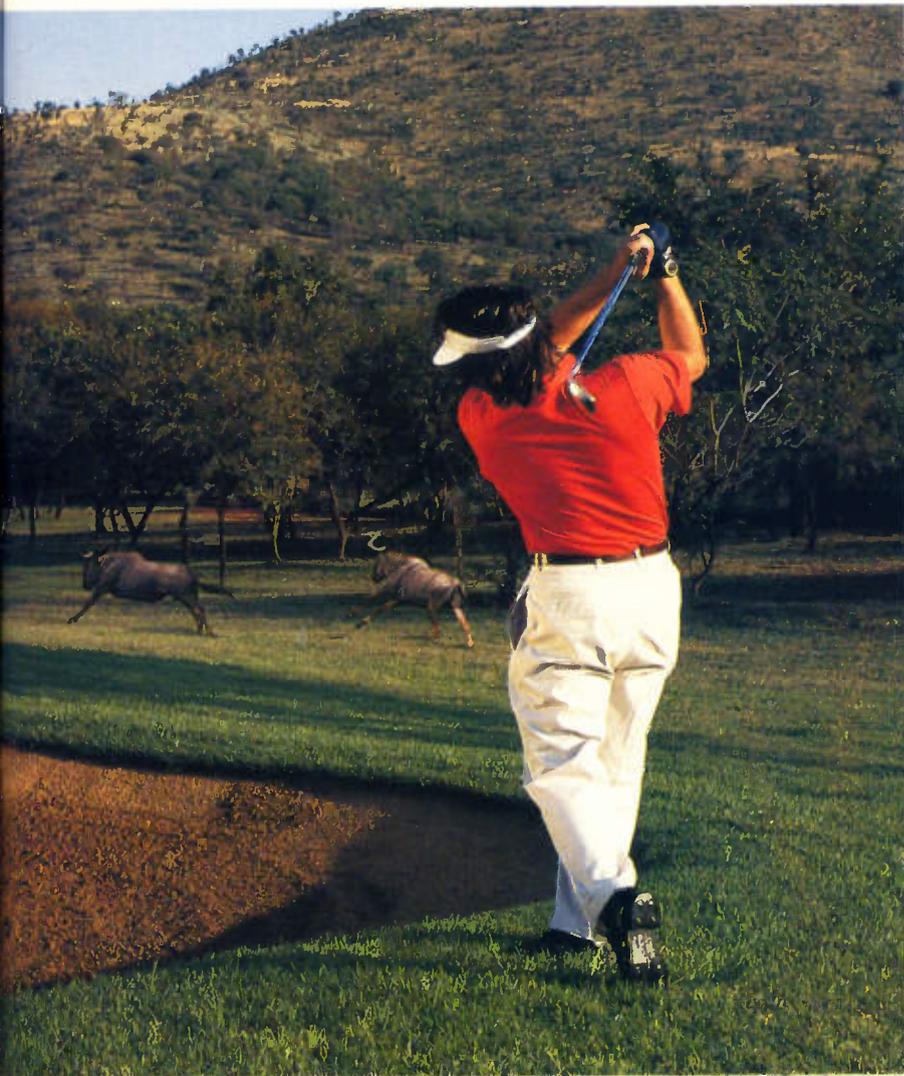
The video studio can also operate independently and is equipped with a Yamaha 1608 professional mixer for the audio side.

Even with all this expansion, Countrylane have not stopped yet and planned for the near future is a programming suite for MIDI which will, amongst other equipment, be equipped with a renovated Neve console of the same type as in Studio B.

Possibly one of the most agreeable services offered by the studio is 'Dine and Jam'. This consists of barbecue on the balcony (both studios) and features Jamaican breakfast or brunch. However, whether you can work after that is another story — especially if you have had a few 'Countrylane Cocktails'.

And Countrylane are not a country and western studio . . . ■
Terry Nelson

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FOSTEX G24S

For some years the 2-inch 24-track has marked a basic division between the men and the boys. If you have one, you are serious. If you have not, you are one of the little people.

The original 1/2-inch 16-track formats (using either Dolby C or dbx noise reduction) undoubtedly opened up a new world of production possibilities to thousands previously unable to play the now overwhelmingly popular role of Studio Owner. But for critical applications, the big machines were audibly superior. Similarly, the arrival of the 1-inch 24-track format with dbx was interesting, but did not really threaten the 2-inch position.

It seems to me that the arrival of the 1-inch 24-track (and to a less degree the 1/2-inch 16-track) with Dolby S noise reduction has changed all that. Most studio professionals will be aware of the rejuvenating effect Dolby SR has had on analogue formats. On paper, 2-inch with SR can equal digital in most regards, and many prefer the sound. The more recently launched Dolby S, though theoretically less sophisticated, subjectively offers a similar level of performance for most applications.

I set up my studio shortly after both Fostex and Tascam launched versions of the 1-inch 24-track Dolby S format. I was psyched-up to go 2-inch; not only did I need to be truly capable of professional results, I needed to be seen to be so. Yet, in terms of performance, cost, physical size and in-built facilities, the new format — particularly the Fostex G24S, was very appealing.

How does it measure up?

In earnest, then, I arranged to do a direct comparison between the two. It involved me and a few other interested (though unbiased) parties, feeding a variety of programme types from a single source, simultaneously on to a G24S and a 2-inch machine running at 30 ips non-Dolby, and comparing the playbacks. The smaller format came out so obviously on top in terms of crosstalk, noise and general fidelity, that we tried a second, brand new 2-inch machine, freshly aligned to new tape (Ampex 456), just to be sure. We also tried various channels and routing arrangements on the mixing console to ensure a fair comparison. The results were the same.

Having established a positive response to the fundamental question of sonic performance, I had to look at the less easily defined issue of not becoming a 2-inch studio. How much work might I miss through noncompatibility? And how it would be perceived by potential clients? My main target area is audio postproduction for video and television, and that type of client generally has a particular set of concerns regarding facilities. They want 24 tracks and they want high quality, but tape width and compatibility with other studios is

less of an issue since any one project is likely to be contained within the same facility.

The main area in which the noncompatibility would be an issue is in mainstream pop and rock music production, where you might be one of a number of studios involved in the recording and mixing process. It is, perhaps, unlikely that anyone starting a project on a 2-inch machine would want to temporarily transfer to a 1-inch simply to do a guitar overdub, unless the project was to be finished on that format. In the opposite direction there is a well established precedent whereby a producer or composer starts a project in the home studio and moves to a larger facility for the string overdub and mix. As all studio owners are well aware, the fact that a studio is sited in an ostensibly domestic building does not necessarily condemn it to a nonprofessional status. Many such installations are acoustically well designed and house relatively inexpensive equipment capable of excellent results for most applications.

An interesting voice on the subject is that of composer, Charlie Skarbeck. Charlie has a private studio with a Soundtracs *In-Line* console feeding a Soundcraft 762 2-inch machine, which he runs at 30 ips with no noise reduction, and a G24S. He is very clear that the 1-inch machine 'sounds far better in all respects'. He composed and recorded the music for the Rugby World Cup last year from which came the album *World Union*, featuring Kiri Te Kanawa. The single from the album reached number four in the BBC charts. Charlie went to Abbey Road studios to record the orchestral parts and the vocals to digital multitrack, but transferred them to G24S in order to finish overdubbing and to mix in his own facility; a process with which he was well pleased. 'The G24S performed very well and I found no apparent loss of sonic fidelity. Of course, I'd really like a Studer 820 with Dolby SR, but until I can afford that, the G24S is my best option.' Charlie hired in a 1-inch machine for the transfer, an operation which is quite common, according to London-based hire companies Audio FX and Dreamhire.

G Street Studio, on the other hand, started out with a G24S but traded it in for a Saturn 625 2-inch machine, citing lack of compatibility as the main problem: 'The cost of transferring from 1-inch to 2-inch meant that in the end it didn't really turn out any less expensive to run.'

The decision list

Compatibility is not a big issue for me because I am not generally just one link in an ongoing production chain; most projects are started and finished here. The list of advantages in choosing the G24S far outweighed any reservations:

1. Reduced capital outlay and running costs: At £7,300 (\$12,045) it is a fraction of the initial cost. The 1-inch machines run at 15 ips, so tape costs are approximately 25% — my 2-inch option would

have been 30 ips non-Dolby. It would obviously be 50% if running your 2-inch at 15 ips.

2. Physical size and location: having a small control room, I would need to put a 2-inch machine in a separate room. The G24S, on the other hand, would just slot straight into one of the standard 19-inch racks behind the engineer and, as it uses mainly cams instead of solenoids for its mechanical movements, its operation would be quieter than average. Also, only half the space would be required for tape storage.

3. Onboard synchroniser: I work substantially to picture. For around £550 (\$907.50), far less than any comparable stand-alone synchroniser, I could have the optional 8330 card inserted in the G24S. This allows it to chase and lock to an external SMPTE/EBU time code. It locks up quickly (under 3 s from park), and there is no fiddling about setting up the interactive machine and synchroniser parameters. It also provides MIDI ports and allows comprehensive control via MIDI (see 5 below).

4. Built-in remote as standard: the entire front panel of the G24S is removable and, by attaching an extension lead, it can be used as a full function remote. This includes all 24 meters and two large alphanumeric windows showing tape position and locate position plus a wide variety of other information concerning the myriad other variable parameters hidden within the depths of its operating system including those of the synchroniser.

5. MIDI control: I use Steinberg's *Cubase* MIDI sequencer package, from a page of which it is possible to control, and to some extent automate, the functions of the G24S. If you like you need never touch the machine or its remote for standard operations. Not only can you program automatic drop-ins and drop-outs, but it is a simple matter to locate to a position on the *Cubase* screen and have the multitrack automatically chase, park and enter play; at which point the *Cubase* will again lock to its time code.

6. RS422 control facilities: though with no immediate plans, the possibility of including a video edit facility is not out of the question. The standard RS422 (Sony 9-pin) port on the G24S would make a high level of integration possible.

Finally, it all added up to the best option for me, and so far I have been very happy with my decision. The machine works extremely well and the fact that I can pass on the lower costs to my clients makes a difference in the present climate. Commercial pressures aside, I too would prefer a Studer 820 with Dolby SR. But I wonder how much real difference it would make to my clients or the quality of my final product. Very little, I suspect. Unless you feel inescapably caught by the 2-inch standard, I can highly recommend this machine. ■

Jim Betteridge

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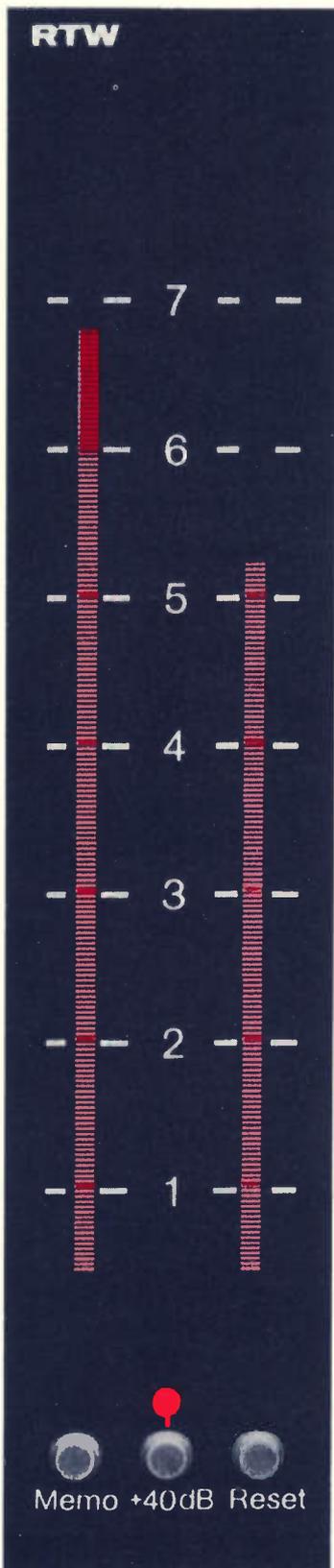
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GERMANY CALLING

Germany's live and studio circuits have both attained special status in Europe. Sue Sillitoe reports on the Germans at play

Ever since the early 1960's, European bands have gravitated towards Germany to gain valuable 'live' experience by playing in the multitude of club venues that are profligate right across the country. Although the heyday of the Hamburg scene, when bands like the Beatles played regularly at the Star Club, may now be more nostalgia than reality, it is still possible for a relatively unknown band to make a living in Germany by playing club gigs.

As one would expect from a country with a lot of live venues, there are also plenty of recording studios, including a good variety of residential facilities. The Germans may not be famous for their creativity, but they are renowned for their efficiency and most of the studios here are exceptionally well run and well equipped. If the studio does not have its own accommodation, the studio manager will be able to organise hotel accommodation for you.

Although Germany attracts some international recording work and is looking to attract more, most of the studios survive by recording the domestic acts that fill the German music charts. Heavy metal is still big business, but there is also a thriving classical and film music business and a number of top studios specialise in handling these types of work.

The type of music recorded tends to break down ►



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Studio Two: Trident TSM 40, 32, 24, live end dead end, Urei 815 monitors, Yamaha NS10, Tannoy Eclipse, Otari MX80 tape machine, Studer A810 TC 4 inch, Sony PCM 701, Sony R-DAT DTC 1000, Dolby A & SR.

Studio Area: 75m² and 25m² respectively. Both control rooms have natural daylight. Accommodation, gymnasium, solarium, parking, in-house maintenance and recording engineers.

according to the area for which it is recorded. For example, Frankfurt studios are handling a lot of dance music production thanks to the success of local bands like Snap. Berlin attracts the 'indie' bands and the remnants of the punk scene. Munich is pop orientated, Cologne is more biased towards the folk scene and Hamburg is geared towards film and TV work. Of course these categories are not written in stone, and studios do handle a variety of work, but each area has its own ambiance.

Just as in the UK, German studios are suffering the effects of recession and this has led to falling rates and the inevitable consequences — staff cuts and studio closures. The business has become cutthroat and very competitive. Many studios are diversifying into new areas such as postproduction, sound to picture work, radio jingles — there are 13 public broadcast stations in Germany — and even publishing, in order to boost their client base.

The German mentality is to have it all — not because it is fashionable but simply because they like to possess more than the studio down the road. There are 10 main equipment distributors that handle all of the brand name products, but there are only two main hire companies — **Audio Rent** and **Productive Studio Hire**. The hire business is less active than it is in the UK because studios buy so much equipment. However, both of these hire companies have a good selection of gear for hire in the unlikely event that the studio does not have what you need.

Most of the top studios have their own in-house engineers and maintenance engineers and although you may have to wait a while if something breaks down it will eventually be repaired without too much trouble. The smaller studios tend to rely on the sound engineer to double up as maintenance man or they will call in a freelance maintenance engineer if the problem is beyond the capabilities of their in-house staff.

Language differences are unlikely to be a problem in Germany because studio staff tend to speak excellent English. Frustrations are more likely to occur as a result of different styles of working. German engineers are far more technically biased than UK engineers. They will not tolerate 'mistakes' and would rather spend time removing unnecessary hiss from a track than

worrying about the creative element. Smaller studios tend to be more experimental and adopt a slightly more relaxed approach.

Facilities

The number and diversity of studios in Germany make it impossible to list them all in this feature. Instead *Studio Sound* will attempt to give a rough guide of the type of facilities available.

Tonstudio Thein: a one-studio, 24-track analogue facility in Bremen which handles mostly classical work. It is equipped with a 54-channel ADT console and has on-site accommodation.

Chateau Du Pape: one of Hamburg's top studios, offering a choice of three rooms equipped with either Neve or SSL desks. Forty-eight-track digital and 24-track analogue recording is available and the studio has its own accommodation and in-house maintenance.

Pauler Acoustics: based in St. Blaisen, this facility is equipped with *Sonic Solutions* and handles mostly mastering work.

Dierks Studios: this four-studio facility based in Cologne has its own mobile which attracts a lot of international business. MCI, SSL and Westec desks are available, along with analogue and digital recording, in-house producers, engineers and maintenance and on-site accommodation.

Maarweg Studios: based in Cologne, this two-studio complex is equipped with both Neve and SSL desks, Genelec monitor and 48-track analogue facilities. Popular for mixing.

Sound Studio N: another Cologne-based studio with three rooms equipped with SSL consoles, 32-track digital facilities and an extensive amount of MIDI equipment. This studio complex handles a lot of work for WDR radio station and specialises in speech and OB projects. It is currently building a new room which is being designed by Andy Munro.

Fairland Studios: based in Bochum, near Dusseldorf, this two-studio SSL-equipped facility offers 48-track analogue recording. Its main clients are pop and chart music artists.

Walldorf Studios: a two-studio complex in Frankfurt equipped with MCI desks. This facility now handles mostly TV and video postproduction work and has a fibreglass network link.

Arco Studios: a three-studio facility offering both digital and analogue recording with SSL and Cadac custom-built consoles. This complex handles most types of work and is one of the most popular studios in Munich.

Touch Down Studios: also based in Munich, this four-studio facility was the first in Germany to invest in a Neve *Legend* VRP console which is now installed in a new Sam-Toyashima-designed room. It also has an Amek desk, an SSL desk and a Soundcraft which is used in its MIDI suite. The



Countrylane Studios in Munich

studio recently bought two *ScreenSound* systems and a new Sony 48-track digital machine. It handles a wide variety of projects, particularly film postproduction work.

Weryton Digital: a three-studio complex based in Munich which is equipped with SSL and Harrison consoles. It offers digital and analogue recording. This facility originally targeted music production but is now gearing towards video postproduction.

MSM Mastering Studios: as its name implies this facility handles mostly mastering work. It is equipped with *Sonic Solutions* in a properly designed control room.

Pilot Studios: primarily geared towards rock and pop music, this three-studio complex is equipped with SSL and Harrison consoles and offers both analogue and digital recording. As one of the biggest commercial studios in Munich it offers in-house engineers and maintenance, and has accommodation on site.

Audio Studios: based in Berlin, this three-studio complex is geared towards recording and mixing. It is equipped with SSL and Harrison consoles and is equipped with digital and analogue tape machines.

CAS Studios: located close to the French border, this facility has two rooms — one equipped with an SSL console and designed for mixdown work, the other with a Westec and designed for live recording. Digital and analogue tape machines are available. The studio attracts a large number of international clients. ■

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THE KEY TO INTEGRATION

Integrated open systems, Francis Rumsey puts us in the picture

An important feature of the developing digital audio market in 1992 is the increasing development of, and interest in, combined audio and video nonlinear editing systems, and in combined audio and MIDI workstations. This represents a significant move towards systems integration in audio and video production, opening up new possibilities in the production and postproduction of audiovisual media. Integrated production systems based around fast digital workstations, possibly involving either audio or video data reduction to some extent, seem clearly to be a key direction for the future, and are set to affect the industry in a similar way that computer-based or 'desktop' publishing hit the typesetting and graphic design industries. Those 'King Canutes' who sit on the beach thinking that they can stop the tide coming in by holding up their hands will eventually have to face the reality of the situation and accept that inevitable improvements in productivity and quality will result from the adoption of such technology.

Recent analysis of the potential effects of digital technology on the industry, both formal¹ and informal, suggest that it is *productivity* and *flexibility* which are perceived as the main benefits of new technology, rather than sound quality, although clearly improvements in sound quality are always desirable. What the industry needs more than anything now is improvements in cost-effectiveness, and users buy digital equipment because it allows them to keep ahead of the field in terms of quality, while also saving time and remaining flexible to changing work patterns. Contrary to the beliefs of some, digital equipment is actually *less* costly for certain applications than the analogue equivalent, if needed an analogue equivalent exists, especially when the digital workstation combines so many functions under one umbrella.

Furthermore, however unpleasant the prospect may be, integrated production systems may also result in cost savings on the personnel front, since perhaps one person rather than two will be able to produce the same result as before in some cases. Clearly a key contributor to the increase in productivity offered by such integrated systems is the random access or 'nonlinear' nature of the editing process, and the ease with which sound, MIDI data and pictures can be manipulated in a nondestructive fashion. With digital mixing and audio-video effects on board as well, the creative process of postproduction is clearly destined for a revolution.

As with any new technology, the first offerings

are not the solution to everyone's problems — some potential users quoting limitations in such areas as track capacity, storage time and cost for certain major applications such as big-time feature film production² — but the evidence of past developments in computer hardware is that improvements in processing speed and storage technology can always be expected, there being no absolute technical limitation to solving the problems which people currently perceive (at least not one that we have yet reached!) The rate of development over the last five years in this field leaves little doubt that Canute's tide will indeed start to wash around his toes, if not sweep him from his throne.

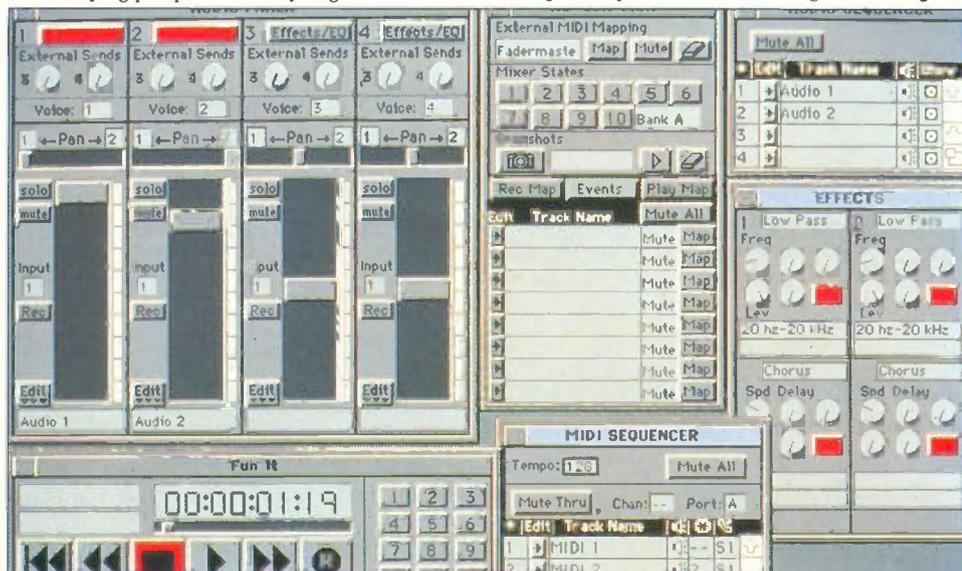
'Open' or 'closed'?

The issue to be addressed here, though, is how importantly the industry should view the matter of compatibility between integrated systems, since there is currently little consensus over things such as user interface, interchange of recordings and edit lists and the use of data reduction. Of course it is reasonable to question whether there is a need for such compatibility, and to consider how far it should extend, since with the rate of change of technology it is increasingly futile to remain 'hung-up' on standardisation. Potential purchasers in some fields, especially those in national broadcasting and audio-for-video operations, find it a worrying prospect that they might have to

commit themselves to one manufacturer with no guarantee that the material they produce and the effort they put into adopting new operational approaches will be transferable to another system if either the manufacturer goes bust, or they simply want to buy from more than one source. Most manufacturers who have commented, though, say that to date there simply has not been enough pressure from the customer for them to do much on the matter of standards.

The attitude among manufacturers to this problem varies enormously, with views on 'open-systems' covering the whole spectrum from one extreme to the other. Some, while not directly admitting it, have seemed until now to want to conquer the world, and have maintained a seemingly paranoid approach to information on such matters as file formats and EDLs, hoping that with an aggressive enough marketing policy and a high enough level of market dominance they will establish either a *de facto* standard, or that, rather like the history of a certain well-known mixing console, there will be enough people using their system for it not to matter that the data is incompatible with other systems. It is not clear whether such a company will then open up its file and EDL formats to others so that they can read this *de facto* standard.

At the opposite end of the spectrum, others are beginning to take the view that an open and collaborative approach to such matters is vital for the greater proliferation and integration of digital



A screen from Avid's MediaComposer



SSL's Scenaria: audio and video in one console.

postproduction, and the only way that the market will gain confidence in the technology. They actively encourage co-operation with other manufacturers. At the last NAB Convention in April a significant development on the open-systems front was announced by Avid, producers of a combined audio and video nonlinear postproduction system, in the form of an Open Media Framework (OMF), which 15 manufacturers have supported on the audio side including NED and Digidesign, with the objective of developing common standards and integration between broadcast, postproduction and desktop video products. OMF is intended to be a common framework for software services, and interchange of contents and descriptions of edited programmes. The presence of Digidesign among the interested parties is encouraging for the simple reason that the company has an enormous established product base. It will be important to watch developments in this area closely.

Initial noises from the manufacturers who are interested in interchange seem to suggest that it is edit lists which will be the first to be interchanged, followed later by audio formats, but even with edit lists there are considerable problems since it is difficult to decide exactly what information will be included. Now that systems often include digital mixing and signal processing functions in addition to simple crossfade, track assignment and editing functions there will be pressure to include this information as well. Even with crossfades the

situation is not as straightforward as indicating the files involved, the edit point and the crossfade time, since systems may also offer many different 'shapes' of crossfade (*à la* Sonic Solutions). Potentially there are two types of edit data to be transferred — one being principally file trimming and edit point data as just described, and the other being mixing and signal processing information (rather more complicated).

Effects

The significance of open-systems approaches to design, and the possibility for interchange of material between systems from different manufacturers, is not the same for all parts of the audio industry.

Music industry

In the music field there is, and will remain for some time, a dominance of multitrack tape in the mainstream 'traditional studio' market. This is partly due to the inability of current tapeless products to offer the track capacity and storage time required by the music industry at a reasonable cost, but also because multitrack recordings are often carried around the world a lot. Nonetheless, it is clear that the 'traditional studio' is suffering greatly at the hands of private music production, and this is where such integrated systems are becoming important. Furthermore, a number of traditional studios are diversifying into independent production of television and radio,

owing to the deregulation of broadcasting, and they too are taking advantage of improvements in cost-effectiveness and productivity offered by new technology.

MIDI plays a large part in the music production process, particularly in private facilities, and there already exists a considerable degree of compatibility between MIDI devices. The MIDI file format, for example, allows almost universal interchange of music sequences between systems from different manufacturers, freeing the user from having to use one sequencer alone. Now that integrated packages from companies such as Digidesign, Opcode and Steinberg offer combined digital audio and MIDI recording there is clearly a driving force to ensure not only compatibility of MIDI files but also digital audio files between systems, as well as audio edit lists.

In classical music production, although there is an increasingly high level of usage of stereo nonlinear editors, there is also a heavy dependence on tape-based systems such as Sony's PCM-1630 and associated hardware. Those using disk-based systems seem content to put up with the time required for up and downloading material, since the advantages gained during the editing process are seen to outweigh this apparently minor inconvenience. Very few people are yet recording original classical music sessions onto disks, and thus the question of 'can you read this disk?' has not yet arisen for postproduction facilities. Clearly, though, it will become important before ▶

very long, since removable storage media are becoming more popular, and stand-alone disk recorders may soon become available.

Broadcasting industry

The small-time broadcaster will be less concerned with the concept of open systems than the large national broadcaster, simply because there is less at stake. The national broadcaster's greatest problems are those of operator training and compatibility between systems, since any system adopted will probably be installed on a large scale in a number of locations. Operators need to be able to move between areas without systems appearing to work differently, and they need to be able to take recordings and edit lists with them.

The problem of the radio broadcaster involved with news and current affairs is that of needing to edit audio material in a very short time to imminent deadlines, and the potential need to edit the same material into a number of different forms for different programmes. Material will arrive in a number of different ways: on tapes from the field, over lines, via ISDN and from studios, and a means is needed of maintaining as streamlined an approach as possible to the production process. A common format for digital audio information in a computer-readable form is again a prime requirement here, and number of proposals have been made for developments in this area³.

Radio drama perhaps has less of a problem because even if it does adopt nonlinear systems (as it is doing in a number of cases) the operation is often confined within a single studio or work-group. Radio music follows similar patterns to that encountered in classical music production, except that DAT is used rather more widely in some countries than it is in CD production.

Television sound has similar problems to the

wider audio-for-video (or video-for-audio) industry, discussed below.

Audio-video postproduction

This is the field which has most eagerly adopted nonlinear systems for postproduction, since the maximum channel capacity of current systems is adequate for many applications. The benefits of independent track laying and editing have been restored, which only otherwise existed with film and which was lost with multitrack tape, and the random access and library facilities make for fast and productive operation. Now that high quality video and audio are being combined in such systems as SSL's *Scenaria* and Avid's *MediaComposer*, the possibilities are even greater.

Open systems approaches would clearly benefit users, allowing for the interchange of edit lists between systems, the proliferation of standard-format effects libraries, common archival systems, interconnection of dissimilar systems on the same network and perhaps even some agreement over user interfaces (although this is less likely). If data reduction is used at all for either video or audio, then the need for a common approach to data reduction is required (see below).

Storage media

It is probable that the industry will have to accept an ever increasing proliferation of different types of storage media. There will be magnetic disks, optical disks, magneto-optical disks, phase-change disks, RAM, tape drives and so forth. This will be largely driven by developments in the computer industry, but need not necessarily be a problem, since a standardised approach to data format and transfer is on the same as a standard for the medium on which that data is stored. Even today

the owner of a hard disk digital audio system can often choose between a number of different sizes and formats of storage device, provided that they can be interconnected with a SCSI cable and meet certain performance criteria. It is right that one should be able to take advantage of bigger and faster storage media as and when they become available, but what is important is the format in which the data is stored on such a medium.

Between manufacturers co-operating in an open-systems approach with a common format for data, interchange would come down to a matter of precisely what type of disk was involved. Users wishing to read disks of a different type to their own would be faced with the same problem as that of a computer owner wishing to read a 3.5-inch disk when he has a 5.25-inch floppy drive. He simply has to buy or otherwise get access to another disk drive. It is most likely that in any given generation of computer storage media the industry will settle for a while on using one of a small number of disk types, and thus for a facility to be able to read most types would not be unreasonable.

When talking about the interchange of material between systems, many people seem to forget that there is a considerable difference between being able to read someone else's files and transferring audio data between systems over a standard digital audio interface. An audio interface like the AES/EBU can only transfer audio data at normal play speed ($\pm 12.5\%$) and also both systems have to be present to allow the transfer. A file transfer over a network, or by exchanging disks, can be carried out at many times audio play speed, limited only by the speed of the network and the performance of the disk drive, being initiated by the receiving system. The transferred file can be

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Silicon Graphics (*Iris Indigo* personal workstation)
Solid State Logic (*Scenaria* digital audio-video system)
Studer Editech Corporation (Digital Audio Workstation)
Truevision, Inc (*NuVista+* graphics and video board)
WaveFrame Corporation (*WaveFrame Systems 1000, 400, 401*)

identical in type, name and characteristics to the original. Furthermore, remote file access over a network allows for files on other people's systems to be accessed without transferring them in some cases. Although a serial network like *Ethernet* is fast for normal desktop computer operations, it is not fast enough for the transfer of large amounts of audio between systems and the use of remote disks without transferring the file to the local workstation, so companies will be looking to optical fibre interfaces such as the FDDI (used by Sonic Solutions), capable of handling some 80 channels of audio simultaneously. In the future it is not unlikely that users will wish to interconnect systems from different manufacturers on the same network, requiring a degree of compatibility between them.

Data reduction

It is likely that many nonlinear systems will use data reduction either for audio or video or both. For systems integrating audio and video there is a good reason to adopt video compression since the data capacity required for video is so much higher than for audio. From another point of view, audio data reduction allows much greater channel capacity and storage time from modest storage media. It is useful that a number of standards have recently been adopted for data reduction, directly as a result of the J/MPEG's (Joint/Moving Pictures Export Group) efforts. MPEG and JEPEG video compression algorithms are increasingly used in graphics workstations, and chips are becoming available which will perform such

compression in real time. Similarly, ISO/MPEG audio compression standards (see *Studio Sound*, July '92) are now available which should make it easier to ensure some compatibility between systems.

It is expected, therefore, that open systems such as those outlined above would be required eventually to cope with both linearly-encoded data files and various levels of data reduction, with file headers to specify the standard in use.

Conclusion

From the high level of activity evident in the area of audio-video and multimedia integration it is clear that it will only be a very short time before such issues become of much greater importance. It will be interesting to see how those manufacturers which stick their heads in the sand over open-systems approaches get on in the years ahead. Possibly they will succeed in their attempts to dominate the market without collaboration, but the competition is so stiff in this area that it is highly unlikely for one company to succeed at the expense of all the others. It is largely up to the user in the end, since if he does not demand such things as have been described, the manufacturers will not bother to provide them. ■

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So far all the discussion, debate and argument about *HD-MAC*, Europe's HDTV system, has centred on picture quality. Most people have forgotten about the sound. But behind the scenes there is a row brewing.

The original intention was to provide surround-sound with *HD-MAC*, ideally based on a display setup with three loudspeakers spread across the front and two across the rear, like a modern 70 mm cinema show. But the five-channel option is now at the expense of audio quality.

All the *MAC* systems provide a digital data stream that can be sliced into at least four sound channels of quality similar to Nicam terrestrial TV stereo. The channels are arranged as stereo pairs, to provide multilingual broadcasting. For *HD-MAC* it would be easy to use two channels for the front sound, and two channels for surround and effects. But this idea has been vetoed, because it jeopardizes multilingual capability.

The official line of the Eureka research project is that the five-speaker surround-sound system will have to be squeezed into the data space set aside for stereo. It will also have to be compatible with existing *MAC* receivers, even though there are very few in working use. The only way this can be done is to 'steal' some of the bits from the stereo sound signal and use them to encode directional sound information for the extra three channels.

Inevitably this means a loss in quality for the stereo signal, and heavily-compromised quality for the surround-sound channels. So, if the official line is followed, *HD-MAC* ends up with relatively poor sound. But new coding techniques, which rely on audio masking effects, have been developed for digital audio broadcasting, Philips' new digital compact cassette and Sony's MiniDisc. If applied to *HD-MAC* these would provide surround-sound of very high quality, with a quarter, or less, the number of bits needed for CD quality audio.

Unofficially work is now underway to develop a five-channel, full-bandwidth system for *HD-MAC* using masking techniques.

The challenge is to find a way of using this new system for *HD-MAC* while retaining compatibility with existing *D2-MAC* decoders. Otherwise future *HD-MAC* transmission will not produce sound on *D2-MAC* receivers. Compatibility between *HD-MAC* and *D2-MAC* has always been a plank of the Eureka strategy.

Although sales of *D2-MAC* receivers are very slow, the manufacturers have invested heavily in the development of chip sets to decode *MAC* sound according to the current standard. Any change now would be very expensive, and very embarrassing.

The escape route will most likely be to use a coding system which compresses the HD 5.1 sound so heavily that there is room for it in the data stream, as well as conventional *MAC* sound. Here, recent announcements and demonstrations by Dolby Labs may well point the way.

Engineers from Dolby's Head Office in San Francisco recently went on a Grand Tour. They visited electronics companies in the US, Japan and Europe. At each stop they demonstrated the first and only working prototype of *AC-3*, a domestic

Barry Fox

Is Europe's prospective high-definition TV system neglecting sound in favour of picture?

version of Dolby's digital cinema surround sound system, *SR-D*. The aim was to get Dolby's licensees to think ahead and leave space in the bit stream of any future digital development for *AC-3* recording.

Blind tests on two films, *Newsies* and *Star Trek VI*, which were released to some cinemas in *SR-D*, convinced Dolby that *SR-D* was bug free. The first announced release in *SR-D* is *Batman Returns*. This will give impetus to *AC-3*.

Both *SR-D* and *AC-3* are 5.1 systems (full bandwidth left front, centre front, right front, left rear and right rear, plus one limited bandwidth subwoofer channel).

For *SR-D* the digital code is recorded in the gaps between the film sprocket holes, so that there is still room for the conventional analogue sound tracks as well. For *AC-3*, the code can go anywhere, on any carrier, where there is room.

It would fit neatly into the space reserved for stereo on DCC, MD or CD-Interactive. It can be buried in the data stream of any new HDTV or digital TV system. It can replace the now redundant FM analogue soundtrack still provided on NTSC video discs sold in the US and Japan. It can even be buried in the unused picture lines making up the black borders at the top and bottom of a TV screen when widescreen movies are transmitted or recorded in letterbox format. It

If applied to *HD-MAC*, new coding techniques would provide high quality surround-sound with a quarter the bits needed for CD audio quality.

might even squeeze onto the analogue subcarrier of a Wegener stereo satellite TV transmission.

JVC has already proposed a method of recording CD-quality digital sound on a VHS video recorder. In the 1.4 MB/s space currently reserved by JVC for two channels, Dolby can cram four different 5.1 recordings, letting one video tape deliver four different language versions of a surround sound movie. In each case the home user gets sound which loses nothing from the version shown to cinema audiences.

Masking compression is, of course, the key. All 5.1 channels are squeezed into a data stream running at just 320 kbits/s, a quarter the data rate for stereo CD.

As with the BASC system used for DCC, the audible frequency range is split into around 30 narrow bands, the sound in each band is analysed and only those sounds which the human ear will detect are coded. Where a loud sound is likely to mask a quieter sound of similar frequency, only the louder sound is coded. This reduces the data rate for 2-channel stereo by a factor of four, from 1.4 MB/s to around 350 kb/s.

For *SR-D* and *AC-3*, Dolby plays an extra trick. The coder continually compares the sound in all the bands of all five channels. Where similar sound patterns are found in more than one channel, the coder economises on bits by coding the information only once and registering the similarity. This is what lets Dolby squeeze all 5.1 channels into just 320 kbit/s. The density of bits in each channel is continually changing, but averages out at around 64 kb/s per channel.

To demonstrate *AC-3*, Dolby engineers stored *AC-3* sound on a conventional computer hard disk, controlled by a laptop PC. The disk also stores time code pulses which synchronise the sound with a VHS deck. The sound is played through five small loudspeakers arranged round a living room, with two larger speakers generating the bass.

The demonstration tape, with a 747 jet flying overhead, music coming all around the listener and excerpts from films *The Hunt for Red October* and *Apocalypse Now*, is very impressive. Even though each channel is using only 64 kb/s, the same as a telephone speech line, both *SR-D* and *AC-3* deliver quality similar to CD, with rock-stable imaging.

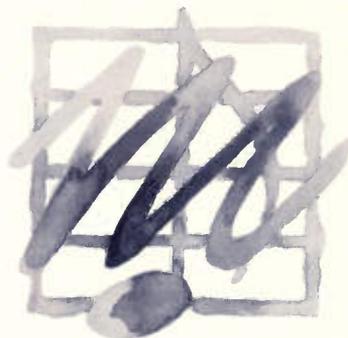
'All we are suggesting,' says Ed Schummer of Dolby Laboratories, 'is that system and format developers should plan ahead and leave 320 kb/s of space in their data streams.'

Dolby has now signed a deal with the Zoran Corporation of Santa Clara, California. Zoran is a custom designer of digital signal processing microchips, best known in the industry for developing the still picture image compression chips for Fuji's solid state still picture camera. Zoran plans to have *AC-3* chips ready in 1993, to sell to manufacturers for around \$20 each (about £11). This makes *AC-3* viable as a domestic product.

I hope that Dolby talks to Eureka about 5.1 sound for *HD-MAC*, and that Eureka listens to what *AC-3* can do before locking the *HD-MAC* standard down to compromised surround sound quality. ■

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It was not as warm a night as some this spring, but it was still rather pleasant. Los Angeles weather is really not as great as everyone who lives elsewhere believes. Ed Bogan thought about that one for a minute. Let's see, it gets cold and wet in the winter, overcast in the spring, smoggy in the summer, unbelievably hot with the Santa Ana winds that come in the autumn and really rather nice in the fall.

'Why am I thinking about this?' he muttered to himself. Then he realized that it was a tool to take his mind off the stress he was feeling. At least his studio had been spared — for now. His recording studio had been on the line. All the years of hard work and deprivation that had gotten him to where he is now. Respected, admired, valued, with 'the' studio complex to record at. As some of the DJs and rappers who used his facilities frequently told him about his place, 'It's kickin'!' 'Fast Eddies' had indeed become a legend in its own time. Located convenient to Hollywood, the downtown area, South Central and the Westside, the multiplex studio drew business from all segments of the music world. Rock, R&B, gospel, rap, hip-hop, metal — it all happened here. He had even recorded a lead violin from the LA Philharmonic for a commercial, and sent it by satellite to New York. Yes, he could do it all.

He could not believe that eight hours ago he had been helping his gun-crazy friend Jack mount a machine gun on the roof of his studio. He had always thought Jack to be a little crazy, what with his gun collection and all. But that was before the second quarterly centennial Los Angeles Riots and Games! He could remember Jack yelling instructions. 'Easy, easy, easy with this baby. It weighs well over a hundred pounds, so take it slow. Slide it down into the tripod. Good.' Jack had always been just Jack. He lived across the alley from Ed in Santa Monica and had frequently invited him into his garage to see the gun collection. Ed had never thought that one day he would be helping Jack to use it — to defend his own business.

'It's a 50 calibre Browning HB Mark II,' Jack had explained as he threaded a line of linked ammunition out of an olive drab metal box and into the gun. He slammed down the loading port and pulled the cocking lever. 'When the looters come, I'm ready. This baby will take out a tramp steamer. It's the main armament on small coast guard vessels.'

The gradual darkening of the sky had foretold another night of savagery. The first night had been bad enough. The fires were the most frightening thing that Ed had ever seen. He had been in terror about the survival of his studios. He had secured the back door of the studio with steel I-beams. The door itself was steel two inches thick. The place used to be a bank branch. And he had instructed his technicians to pile up concrete cinder blocks behind the closed blinds on the front plate-glass windows.

The horror of it rolled through Ed's consciousness over and over again. The fires, the looting, and the shooting. Especially the looting. Everything in sight. And not just food, liquor, clothes and appliances. Camera stores, Electronic

Martin Polon

Insurance: can you afford to be without it?

stores. Audio and Video stores. But not just retail. Professional Audio and Video supply houses looted and burnt out as well. Right there in Hollywood. And several studio colleagues had phoned with harrowing stories of their own.

Ed's studio had survived in the final analysis because it was tucked in next to a Korean-owned liquor store in Hollywood; not an unusual pairing with the recent growth of mini-malls in the area. Ed realized he had been spared only by good fortune and the militant response of the Korean family that owned the neighbouring business enterprise. And perhaps because of Jack on the roof. As the looters and rioters approached the block, the entire extended family of the liquor store owners 'hit the street' with shotguns, assault rifles and semi-automatic pistols. They protected the entire block of retail stores around their liquor shop all night. They knew that the looters had set fire to everything after they finished and sometimes before! The Koreans had several 'firefights' with the looters. They seemed to appreciate the Browning above them. They would smile and wave at Jack — not a single bullet had to be fired from the machine gun. Law and order was nowhere to be seen — until morning, when the National Guard troops came rolling through on their armoured personnel carriers. Ed had described his harrowing night over the phone to his wife, virtually in a state of shock.

Now nothing would make me happier than to report that the above story of the blissful life in Los Angeles, is a hypothetical one! Unfortunately, except for the necessary changing of names and other facts to provide anonymity, the story is based in truth. It incorporates numerous tales of woe that were visited on many members of the electronic entertainment community during the 1992 disturbances. What is even more distressing is that many businesses and individuals victimized will not file official reports for fear of financial reprisals.

It would be too easy to write all this off as another LA Land adventure. A recent actuarial study of catastrophic happenings to electronic entertainment industry business ventures

'It's a 50 calibre Browning HB Mark II,' Jock explained as he threaded ammunition into the machine gun

estimated that a studio in a small town is 10 times less likely to have a major 'negative event' occur, and a suburban studio is five times less likely to have problems in the so-called 'big city.'

That means studios in the centre of cities like Los Angeles, New York, Chicago, London and Paris, all pay a price for their location. Big city studios have long ago moved to the side streets and periphery of the downtown area due to the high cost of commercial real estate and the pressure to create office space.

So many 'intown' studios find themselves in less-traveled and frequently less-patrolled precincts of the central city. Add to that the fact that all studios, no matter what the location, are what insurance adjusters call 'attractive targets.' The average 'big city' mainstream professional recording studio in just one mixing suite will have equipment valued at a higher amount than the entire contents of a large hi-fi store!

That this kind of difficulty can strike any audio-based business anywhere is a given fact. There are many precautions and business concepts that need to be examined related to the provision of insurance coverage for studio businesses. It might be useful to review some of the more pertinent areas:

1. Studio Design — it is interesting to note that studio designs seem to go through phases. Some studios will be closed up and quite fortress-like while other facilities will be light and airy — frequently with significant open external footage composed of glass. It is not easy to state that one design is superior to the other but rather to acknowledge the location and the potential for difficulty in obtaining adequate insurance coverage — especially after the LA experience. One studio owner put it thus, 'I've never had a problem but I decided to blend into my neighbourhood when I remodelled. The exterior facade is the same kind of red brick construction that all of my neighbors use in this industrial district adjacent to downtown. Inside, my studio is a hoot. But I have a set of heavy metal front doors and an equally off-putting rear entrance. My parking lot is surrounded by chain-link fencing topped with razor tape. I look for all the world like the small printing companies and chrome plating works I co-exist with down here.' The point here is that the concept of having capacious plate-glass windows overlooking tape duplicating or some other work or prep area within the studio complex is just not advised in the 1990s. Neither is the practice of using decorative wooden doors — especially at the rear of a studio. In a recent burglary, the enterprising felons used a large truck with a snow plough attached to turn the back door of the facility into kindling wood. Insurance underwriters are very savvy to this kind of detail.

2. Coverage — this issue has become one of the most vexing for all kinds of electronic entertainment-related businesses disrupted by the LA disturbances but with significant implications for studios and audio facilities everywhere. The first issue that comes to mind is whether or not to carry insurance. In LA, some facilities did and some didn't, and some simply did not have ►

enough. Very few facilities were actually burnt to the ground, but even this represented a paradox for some owners. One studio owner gave us his insight. 'Of course, I carry insurance. I have over several millions of dollars invested in my studio equipment, the building and the land. I would be crazy not to protect it with insurance. But the curious thing is, I have never had a problem and I escaped the current 'troubles' the same way. Scot free. I dutifully pay my relatively reasonable premiums and have yet to collect a penny on my policy. Isn't insurance really for those who never have a reason to collect?'

Curious indeed, since rising premiums and higher deductibles frequently confront any small business owners filing a claim. One of the major complaints heard from all kinds of small businesses after the LA riots was the precarious position they were placed in by their insurance companies. Said one owner of a studio, 'we suffered only minor damages. Minor in that it will cost 5,000 dollars instead of 500,000 dollars to repair. But if I had been burned out, I would have a total settlement on my policy to it's endorserable limit. I could open a studio in the Simi Valley or some other safe locale or even open a small restaurant — a dream I have been nurturing for some time. And I would be able to insure again in the new location without penalty. But if I file a claim here — calling attention to both my expensive equipment and where I am *vis-a-vis* the riots — I will pay dearly for any future insurance if I can get any at all. The result is that I will not file on my policy and I am not the only one. I have several friends who are not even filing police reports lest the insurance companies pick up on what happened.'

3. Limits — one problem many studio owners have is the failure to recognize the real values of their total investment for insurance purposes. It is not unusual for a recording studio to value the physical plant at the prices it cost to build it ten or 15 years ago or at the assessed valuation for property tax purposes. Many studios depreciate their consoles and tape machines for tax accounting, and assume that the practice will work as well for insurance. The problem is that the construction or acquisition cost of a building and its fixtures after a decade or more is potentially only a fraction of its 1992 replacement value. Equipment costs have risen as well, so a good rule of thumb is to have the agent or underwriter reappraise the facility and its contents regularly — that is, if you can afford it. One studio owner explained his concerns during the riots. 'I knew I was underinsured. The fact of the matter was that Hollywood is changing — the yuppies call it an "emerging neighbourhood." I could not afford to have my policy upgraded. So the insurance agent and I played blindman's bluff. I pretended I had not added equipment in ten years and they pretended I was in a safe neighbourhood.'

Another variation on this theme is those studio owners who just do not get around to notifying their insurance company of added equipment or of physical changes to the facility. An insurance adjuster whose practice in high technology includes adjusting recording studios commented,

'it is true that one can always produce documentation for things added but insurance companies keep far more lawyers around than you will ever think about. And you know where that's going to leave you if you do not do your homework!' One way to protect a studio against most if not all eventualities, is the practice of buying 'exact replacement' coverage, if it is available. It will be more expensive and frequently significantly so, but it will cover price increases caused by inflation.

4. Insurers — generally, recording studios and other audio facilities located in large cities exist on the periphery of more fashionable neighbourhoods. Sometimes they are in industrial zones, sometimes in transitional areas. It is an unfortunate reality of urban life that insurance companies charge more for coverage in such zones if they sell coverage at all. Although barely legal, the practice known as 'redlining' does exist and the small studio owner can frequently be a victim of it. One of the fears expressed by several LA area audio business owners in the wake of the riots, is that the geography interpreted as being uninsurable (especially for the high cost items found in a studio or related facility), will expand — forcing them into the hands of less viable insurers. Many small business owners in and out of audio had the shock of a lifetime when they discovered that their 'high risk' coverage had in fact been written on an unregulated Caribbean insurer who could not meet the large claims from the LA conflagration.

It is estimated by state insurance authorities that insurance claims for business losses in the wake of the LA urban tragedy could exceed \$800m. Private sources put the figure at closer to a billion. The real tragedy will be those businesses that had no insurance, were underinsured or bought insurance from unregulated 'high risk' carriers. Their losses may reach the level of half again the official figure.

5. Precautions — the use of the 'right' kind of preventative measures can make the difference between a major loss and a minor one; hence the enthusiasm shown by insurers for such precautions. The obvious category here is for a sophisticated entry alarm providing complete coverage of all spaces in a studio facility and all entrance and exit portals. Such a system would also provide sophisticated smoke and fire detection capability. But the most difficult decision to make in a recording studio or similar audio electronics facility is whether or not to use sprinkler systems in the complex for fire protection. A fire prevention expert opted, 'there is no replacement for a sprinkler system. A well designed and zoned installation of sprinklers, when coupled to a state-of-the-art detection system, will save a facility — with water damage only in the actual area of the fire. The fear expressed by many studios owners is of a deluge of water destroying all of their electronics on premises. In fact, by putting

out a fire, a sprinkler system will save the building and all of the equipment not directly in the path of a fire. And it is important to remember that a studio fire in a nonsprinkler-equipped building can destroy nearby equipment through smoke damage and heat even if the equipment is not actually incinerated.'

6. On the road again — the concept of insurance on the road is frequently of equal or greater importance to location recorders and to concert sound providers than their at-home needs, but it receives far too little attention. A recent survey of audio professionals who travel with their equipment revealed that most fall into one of three groupings. The first category is the large concert or TV sound-audio recording providers who use large buses or diesel tractors pulling semitrailers specifically designed for audio on the road. All equipment is permanently installed for use on the location trucks and well compartmentalised on the touring concert vehicles. Such vehicles are well designed to prevent break-in, can be properly secured and the engine and cab locked off. All are equipped with elaborate alarms and there is frequent use of armed guard services to protect the vehicles while crew members sleep — usually at up-trend demographic hotels. If a rock tour is involved, there may be dormitory vehicles but there will also be security staff on duty 24 hours. Needless to say, the insurance companies love these kind of precautions.

Consider the second level of audio providers. Much smaller than the major touring companies or location recording trucks, these folks have a small van or a truck loaded with equipment in touring cases. The third group are the itinerant recordists and DJs who travel with their gear in their car. The problem is that these folks usually sleep in the least expensive roadside accommodation they can find. Trouble frequently finds them with equipment stolen from cars and trucks overnight out of dimly-lit parking lots. Even bringing the equipment into the motel complex may not solve the problem since several recent thefts have taken place from a room while the occupants were at dinner! It almost goes without saying that none of this makes the insurance companies happy. It is a sure bet that unhappy insurance companies demand higher premium rates and eventual cancellations. The extra cost of better and safer accommodation plus the practice of storing equipment in an occupied room may well be worth the difference in the long term.

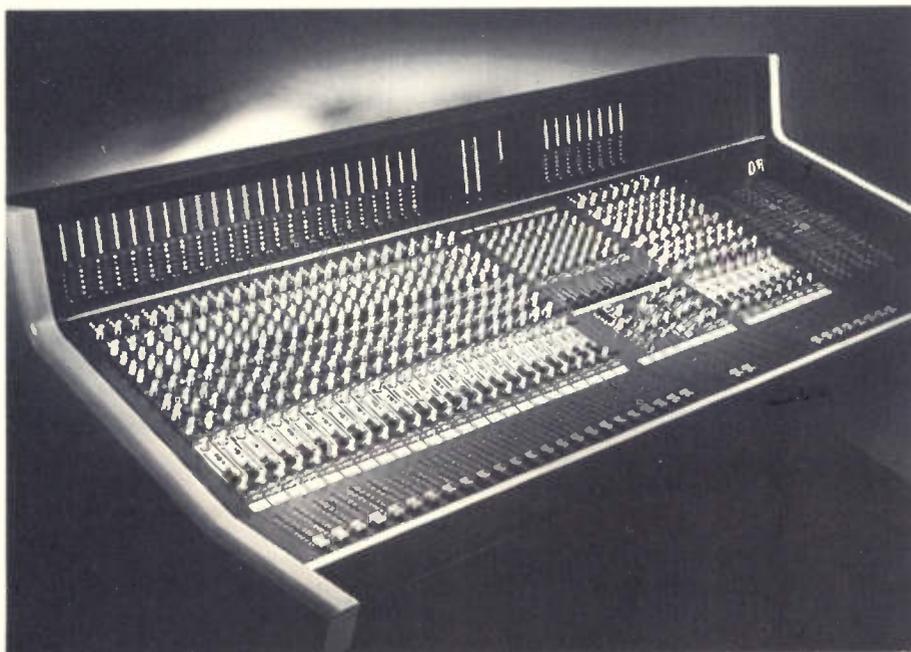
The bottom line here is very simple; you get what you pay for and you 'pay' for insurance in several ways. Expensive studio facilities warrant similarly extravagant safety precautions and insurance from rated, bonded and regulated insurance providers via well-established brokers. In the case of insurance services, there are no bargains. A provider who will let you take risks in spending on securing your studio may also take risks on reinsurance and bonding and potential indebtedness. No one can foresee or forestall an occurrence such as the LA riots but every studio and related audio facility should protect themselves and their investment from every eventuality. ■

'You "pay" for insurance in several ways'

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TRACK RECORD

A technical review by Sam Wise of the Tascam 238 SYNCASET tape recorder

Tascam were the first company to hit the market with an 8-track Compact-Cassette-based recorder which truly behaved like a multitrack — the 238 SYNCASET. This has been available since at least 1988, and has proved to be very popular, I often borrow one myself to make recordings of my son's band. Surely, the quality of this narrow track format must suffer terribly when compared to a large format multitrack? But does it?

In this review we will concentrate on recording performance, comparing noise, crosstalk, distortion and other issues with a 238 machine used without noise reduction, and with recently measured full-sized multitracks, with and without noise reduction.

There are several areas which in the cassette format may produce performance differences compared to larger machines. Among these are recordable track width and tape speed. We will examine these first, and determine the loss of performance which we might expect.

Track Widths

As we all know, tape comes in differing widths. The smallest analogue format presently in use is the Compact Cassette, with a tape width of 1/2 inch or about 4 mm. Some of this width is lost to provide gaps or guardbands between the tracks to prevent crosstalk, leaving about 0.25 mm of usable width per track on the eight-track 238S. An alternative compact recording format for comparison purposes is the 1-inch 24-track, which uses about 0.7 mm tracks or nearly triple the track width. A 2-inch 24-track, obviously, at least doubles this again.

In theory, halving the track width will give an increase in noise of about 6 dB, making the

cassette 8-track recorder about 9 dB worse than the 1-inch 24-track and 15 dB worse than the 2-inch 24-track.

In addition, since the guardbands are smaller, it would be expected that the cassette-based machine would be worse in crosstalk performance, having potentially increased problems with track bounce down.

Tape Speed

A secondary effect of reduced tape speed is that the recorded wavelengths are reduced. The shortest wavelength that can be reproduced is governed by the gap width of the playback head. Unfortunately reducing the gap width to work with the shorter wavelengths also reduces the head output level, particularly where the same head is used for recording and playback. The SYNCASET uses a speed of 3 1/2 ips or 9.5 cm/sec,

which is double that of a standard cassette mechanism, but still only a quarter of the speed used for a large format multitrack.

To get enough high frequency content onto tape, it has always been necessary to boost the HF on record, and cut it again on playback. The frequency used to begin the HF boost is directly related to the wavelength, getting lower as speed is reduced. In real music the higher frequencies are at a lower level than the middle and lower frequencies, making this little of a problem, but conflict begins to arise when this turnover frequency drops down toward the middle frequencies, increasing the risk of tape overload or 'saturation'. The desire to get a low background noise off tape forces the recorded level up, further increasing the risk of overload. The audible effects of this overload are apparent loss of high frequencies off tape, combined with unpleasant distortion.

The noise reduction system used with the original (and still current) 238 SYNCASET is dbx. This gives an improvement in noise performance over Dolby B or C (which were designed for standard cassette speeds and track widths), but dbx takes no account of the changing overload characteristics of tape with frequency. In addition, the Dolby products more closely observe the effects of what is termed 'aural masking', and tend to have less audible side effects caused by their operation.

Masking occurs when a loud audio signal causes another quieter audio signal to become inaudible. For example, in a car, as speed is increased, wind and engine noise also increase. This makes the car stereo less enjoyable — masking the wanted ▶

MANUFACTURER'S SPECIFICATION			
Line Input (x8)	30 kΩ, unbalanced	Total Harmonic Distortion	0.8% (400 Hz, 0 VU, NR off)
Impedance	-10 dBV (0.3V)	Crosstalk (adjacent channel)	70 dB (1 kHz, NR on)
Nominal Input Level		Erasure	70 dB
Line Output (x8)	470 Ω, unbalanced	Tape Speed	9.5 cm/sec (3 1/2 ips) ± 0.5%
Impedance	-10 dBV (0.3V)	Pitch Control	± 12%
Nominal Output Level		Wow and Flutter	± 0.08% Wtd.
Bias/Erase Frequency	85 kHz ± 5 kHz	Fast Wind Time	Peak (DIN/CCIR/IEC/ANSI)
Equalisation	3,180 µSec	Recording/Play Time	70 sec with C-60
Frequency Response	30 Hz to 16 kHz ± 3 dB		15 min with C-60, 22.5 min with C-90
Signal-Noise Ratio		Dimensions (WxHxD)	480 x 149 x 345 mm
Overall RE: 3% THD+N	75 dB (CCIR/ARM, with Dolby S)		(19 x 5 7/8 x 13 3/8 in) including rack mount wings, feet, etc.
	64 dB (Unweighted, with Dolby S)	Weight	9.5 kg (21 lbs)
	52 dB (CCIR/ARM, without Dolby S)	Power Supply	120/220/240 V AC 50/60 Hz, 47 watts (General Export version)
	51 dB (Unweighted, without Dolby S)		

signal. So you turn the stereo up, forcing the car noise back toward the background. Dolby noise reduction systems have always been based on an understanding of how hearing works and have used this knowledge to make background noise reduce or seem to disappear. Over the years more information has become available about how we hear, and it has been possible to make increasingly complex integrated circuits with no increase in cost. These facts allow the new Dolby S and SR noise reduction systems to go further than previous systems in reducing audible noise. They are also more successful in keeping the recorded level on tape below the point where serious distortion or HF loss begins to occur. This is poignantly shown in graphs later in this review.

The combined effect of the two performance-limiting criteria of narrow tracks and low tape speed is to give the basic cassette format both a diminished dynamic range and a limited high-frequency response at higher recorded levels. But, how comparably far will Dolby S improve the performance of the cassette-based recorder, with its doubly more stringent limitations?

Performance

All of the following tests were made on the tape and 238S machine as supplied by Tascam, without any further adjustment to optimise response. The tape used is Maxell XL11-S.

Record level and frequency response: Fig. 1 shows the frequency response from record to replay with and without noise reduction. The input level is -10 dBu, corresponding to just below the 0 VU point on the machine's meters. Here, there is little difference between the two curves. Performance is excellent, being within about ± 0.3 dB from 70 Hz to 15 kHz — comparable with digital recorders. However, alignment will not be as stable.

In Fig. 2, the level is increased by 10 dB to 0 dBu. Machine meters indicate at their highest level. Now the performance difference is obvious. Without Dolby S, the replayed level begins to drop just above 1 kHz, reaching -3 dB at 13 kHz. With Dolby S, performance remains at ± 0.3 dB as before.

For comparison with a more expensive recording format, the Fostex G24S, 24-track 1-inch recorder with Dolby S remained within ± 0.5 dB from 40 Hz to 20 kHz. This is better than the 238S, but only marginally so.

Distortion: Figs. 3 and 4 show the noise and distortion of recordings of a 500 Hz tone, with and without Dolby S. In Fig. 3, recorded at -10 dBu, both curves show a clear third harmonic distortion product at 1.5 kHz. In musical terms this

corresponds to an octave and a fifth above the original tone — that is, it is musically related but could cause a clash when the musical signal is complex. Noise reduction gives a small improvement to this of 3 to 4 dB. But the fifth harmonic distortion product at 2.5 kHz, which is musically much more of a problem, is gone with Dolby, and the blip at 16 kHz is reduced by 20 dB.

Fig. 4, recorded at 0 dBu, shows the increased distortion caused by the tape at higher recording levels. The noise reduction of Dolby S is less at this level, and it is less important since the higher recorded level masks the noise better, but the higher harmonics of distortion are much reduced — making a more pleasant sound. In overall THD+N terms, this is clearly shown in Fig. 5, where distortion is decreased with Dolby S by about 15 dB at most frequencies.

In Fig. 6 and 7 we investigate intermodulation distortion or IMD. This shows the effect of distortion created by the combination of two tones, in this case at 13 and 14 kHz. In Fig. 6, without noise reduction, there are a series of intermodulation products surrounding the original tones, then some more visible down to 2 kHz. These are not aurally masked, and will be audibly unpleasant. Fig. 7 shows that with Dolby S active, the distortion products nearest the original tones are only slightly reduced in level, but those distant from the original tones and therefore more audible are virtually eliminated.

Again, comparing these results with a larger-format recorder shows that distortion performance is virtually the same on both formats.

Noise and crosstalk: In Figs. 3 and 4, in the frequency region above 2 kHz, what is shown in the graphs is actually the residual noise with some distortion products poking up. The visibly obvious effect of Dolby S is a reduction in this noise by about 20 dB compared to the curves without noise reduction. Wideband noise measurements are shown in Table 1.

All of these measurements are referred to the 3% distortion level at 1 kHz when recording with Dolby on. Therefore, since one of the benefits of Dolby S is distortion reduction at high recorded levels, the measurements shown with Dolby off are a bit optimistic. Their real reference level would be lower. Even so, it is clear that weighted measurements — those intended to reflect the way we hear noise — give a 22 dB improvement with Dolby S compared to those without noise reduction.

Once again, looking back at the Fostex G24S review, there is a noise penalty of about 8 dB on the cassette-based system compared to the 1-inch format. This almost exactly agrees with our theoretical estimate. None-the-less, this is an

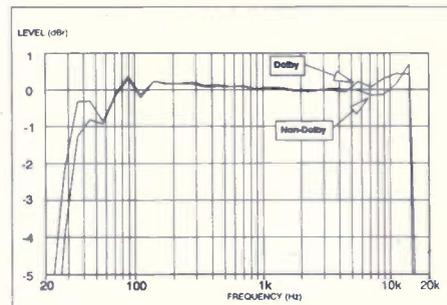


Fig. 1: Record to replay frequency response. Channel 1 Dolby, channel 6 non-Dolby. Referenced to -10 dBu input

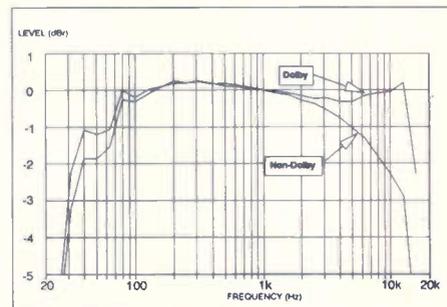


Fig. 2: Record to replay frequency response. Channel 1 Dolby, channel 6 non-Dolby. Note drop off of non-Dolby signal at higher input level

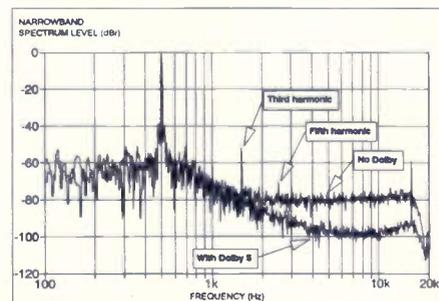


Fig. 3: FFT spectrum of 500 Hz (record to replay). Input level -10 dBu. Channel 1 with Dolby S, channel 5 without

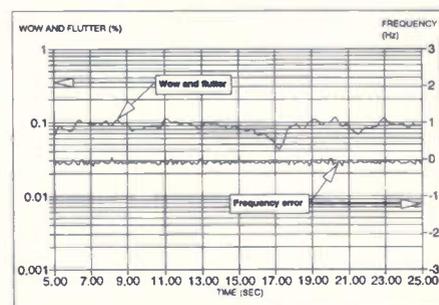


Fig. 4: FFT spectrum of 500 Hz (record to replay). Input level 0 dBu. Channel 1 with Dolby S, channel 5 without

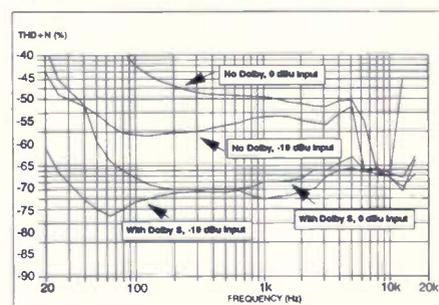
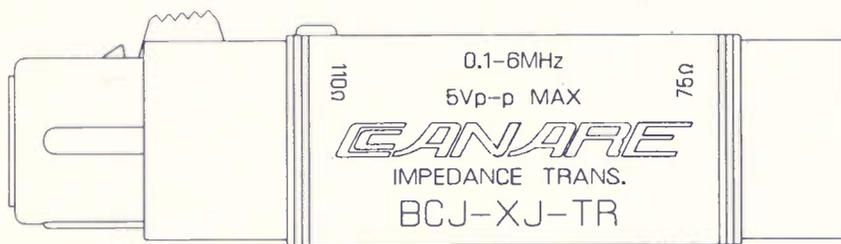


Fig. 5: Record to replay THD+N. Note increased distortion without Dolby

TABLE 1

Measurement Type	Electronics only	Rec/Replay with Dolby	Rec/Replay no Dolby
22 Hz to 22 kHz, RMS unwt'd	-96 dBr	-69 dBr	-57 dBr
22 Hz to 22 kHz, avg, unwt'd	-98 dBr	-69 dBr	-58 dBr
'A' wtd, RMS	-101 dBr	-82 dBr	-60 dBr
CCIR 468-3, wtd	-89 dBr	-70 dBr	-48 dBr
CCIR-ARM	-99 dBr	-80 dBr	-58 dBr



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impressive performance, substantially exceeding the manufacturer's specification. It is also much better than things were when I started in audio on a 1-inch 8-track, for example better than the early Beatles or Stones recordings.

Erasure is also better than the specification, approximating to the noise figures given above.

Record to replay crosstalk is shown in Fig. 8 with Dolby S active. This was created by recording on tracks 2 and 3, with replay from 1 and 4 shown. The levels shown are relative to the input level of -10 dBu. At low frequencies, the effects of 'fringing' can be seen. This is the spreading of low frequencies across the tape when recording, and a similar effect when playing back. It is evident on all types of recorders and is only a little improved by the Dolby S system. However, above 100 Hz, performance rapidly improves as fringing ceases to be a problem and Dolby S begins to provide more benefit. Over the critical midband, the crosstalk figure is between -70 and -80 dB, reducing to -60 dB at the high frequency end. Again, this is a creditable performance and interestingly is substantially better than that found on the larger format Fostex G24S.

Wow and flutter: The cassette-tape format brings with it another possible performance limitation — wow and flutter. In a reel-to-reel machine, the tape path and handling are easily optimised, limited only by cost. However, in a cassette format, the maximum capstan size is defined by the cassette opening, as is the tape path and the smoothness of tape travel inside the cassette. All of these limit performance. How does the Tascam 238S fare?

Fig. 9 shows Wow and Flutter and Drift. This particular graph was taken near the centre of the tape. W&F are increased a little at the beginning of the tape and are lower near the end. The result, measured according to DIN/IEC peak, weighted standards is about $\pm 0.09\%$, slightly worse than specified at 0.08%. Frequency error or 'drift' is negligible from end to end of the tape record to playback — no absolute measurement was possible.

This performance compares to a measured 0.045% on the larger Fostex G24S, and 0.025% on a more expensive Saturn 2-inch 24-track. This difference will be audible on some types of recording, particularly piano, harpsichord and unaccompanied acoustic guitar. On many of the

music types for which this machine might be used, the effect will not be noticeable. Note that the cassette itself may have a profound effect on this performance parameter.

Scrape flutter measures 0.25%, compared to 0.114% on the larger open-reel machine. This type of flutter will mostly be audible as noise modulation of recorded signals, and is partly reduced by the Dolby S system.

Squarewave performance: Fig. 10 compares an input (via machine monitor) and output (via tape replay) of a 1 kHz square wave. The downward slope at the right of the output waveform is due to high frequency roll-off, with the ringing at the left mostly due to the recording head and its drive electronics. This does not change when noise reduction is on.

General construction and operation: During the tests, the machine behaved extremely well, with good tape handling and usefully accurate locator operation. Internally, things are well put together and relatively easy to service, and the mechanism has stood the test of time.

Summary

A cassette-based 8-track recorder is not going to perform as well as a carefully designed reel-to-reel machine. But neither does it cost as much to purchase or keep fed with tape. Its size compared to larger machines can also prove to be an advantage in a compact studio. The 238S does, however, perform impressively — Dolby S bringing substantial performance benefits in noise, distortion and high frequency response.

As far as audible quality is concerned, like the larger Fostex G24S, the Tascam 238S sounds much cleaner, brighter and tighter than machines with earlier noise reduction systems, or even none at all. It is rare to hear any deleterious effects introduced by the Dolby S noise reduction.

As well as considering the 238S for independent 8-track operation, it could also be a means of providing an extra seven tracks in recording operations where it can be used as the source of SMPTE time code, working with video or alongside a larger SMPTE slivable multitrack.

With its track record for reliability, the Tascam 238S must be an excellent buy for many applications which require good, but not ultimate performance levels. ■

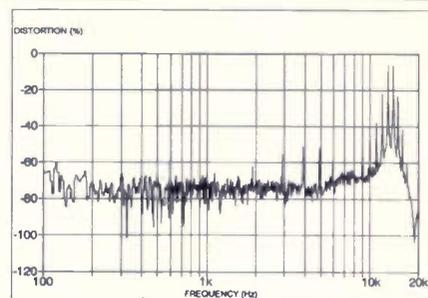


Fig. 6: FFT spectrum of channel 13 and 14 kHz 1:1 CCIF tone (record to replay). Input level 0 dBu. Channel 3 measured without Dolby S

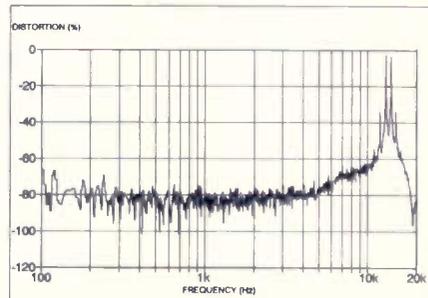


Fig. 7: FFT spectrum of channel 1/3 and 14 kHz 1:1 CCIF tone (record to replay). Input level 0 dBu. Ch. 3 with Dolby S

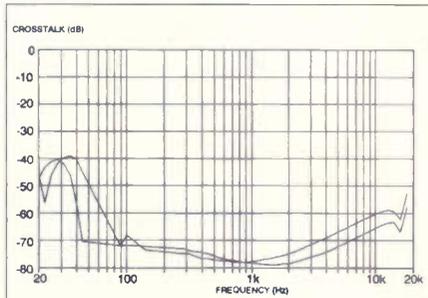


Fig. 8: Record to replay crosstalk (dB). Channels 2/3 recorded, channels 1/4 measured — both very similar. Input level to channel 2/3 = -10 dBu with noise reduction

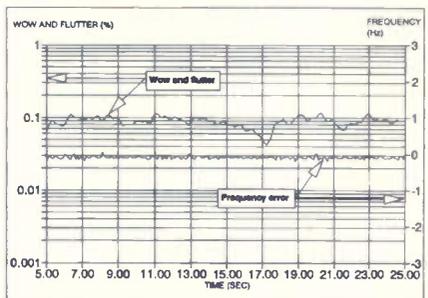


Fig. 9: Wow and flutter with frequency error on secondary y-axis

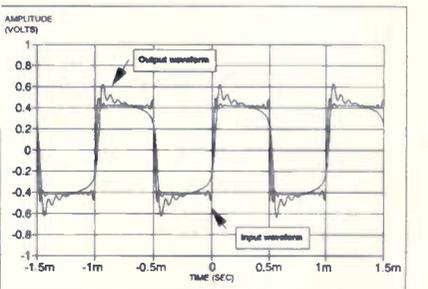


Fig. 10: Record to replay response to 1 kHz square wave. Channel 1 input level -10 dBu. With and without Dolby S

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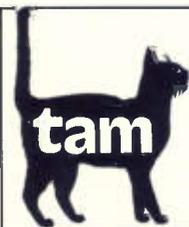
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In a recent BBC TV documentary on airlines the captain of a Boeing 747 said, despite the fact that it has always happened so far, that each time his 300-ton jumbo takes off he thinks that there is an element of magic about it. It is easy to have a similar feeling about microphones and their ability to convert sound into electrical signals with a character all of their own. It is essential never to take mics for granted. There should always be the opportunity for surprise.

It is in the area of microphone technique, however, that most published texts disappoint. It may not be their fault at all. Microphone technique is subjective and no two circumstances are the same. The musician, the instrument or some part of it may differ, how it is being played and the context it is being played in — all can change how you approach miking. It is difficult to capture these aspects in an instructional text but few even try.

Mic technique has, of course, changed. Looking back at recommended techniques of the past illustrates this clearly. Howard M Tremaine's *Audio Cyclopedica* (1959, reprinted 1969), an excellent reference book in its day and still worthwhile, rather avoided the practical uses of microphones but summarised with points like, 'A single microphone pick-up should be used whenever possible. When two or more microphones are used simultaneously for recording either dialogue or music, they should be placed at least 10 feet apart. Also, their levels should not differ by more than 2 dB and have similar frequency characteristics.' The author did clearly explain in other parts of the chapter why he felt these requirements were necessary and, of course, at that time he was not really concerned about multitrack recording. But times change.

And then there is the apocryphal tale of the studio which insisted that all microphones should be placed at the distance from the sound source at which their specification was quoted. Special permission had to be sought from the studio management to place a mic any closer. Verification of this would be welcomed.

Tremaine's recommendations were based upon good engineering practice. A single mic pick-up is better than two or more because there is less likelihood of interference and cancellations between them. The

The unexplained microphone technique Keith Spencer-Allen explains

need for distance spacing was to reduce phase cancellation.

There came a point in the development of mic technique when it was decided that the end justified the means; that the artistic effect outweighed the need for observing traditional engineering principles and so the creative recording process came of age.

In the years before sophisticated signal processing became available many of the creative aspects of recording ended at the mic. The choice of mic was important because if it did not sound right by the time it reached the desk, there was not a lot available to modify sound afterwards.

There are some aspects of this philosophy that still have some creditable value today. Obtaining the right sound on the studio floor usually sounds better than any form of processing. To achieve this effect the choice of microphone can be critical.

Good quality mics with a smooth frequency response, consistent off-axis response and high SPL handling are one way to work. There is also benefit in the opposite approach of using the deficiencies in a mic to your advantage. This can be in any areas of the mic's response. For example, a bass light mic can be very useful in reducing spill between instruments. Having the mic not pick up low frequency spill often seems far more effective than an LF roll-off on the console. Many percussion instruments record better with a bass-light mic if they are to form part of a large mix and not be too exposed.

I have an old Shure *Unidyne 55* that has definitely seen better days, but it does two things very well. First, it is a great guide vocal mic picking up plenty of voice in a rock situation without too much else. The voice character is such that it cuts very well on headphones for cues. Its forte, however, is the high-hat. Some high-hats are just difficult to record, particularly if the drum tuning or patterns dictate lots of mics close. With a little adjustment the *55* has the ability to turn any dumpy high-hat

into a sizzling 'hi-fi' sound with few side effects. Normally it is kept in reserve.

Another unlikely mic I have pushed into service is a cheap electret made by the Japanese Pearl company. I frequently use it for vocals where the voice has to sit back in the track but needs a very raw rough quality. This mic makes everything sound like that but in the right situation it is the perfect choice.

Another example of mic abuse was with a very smooth rhythm guitar sound which wasn't happening. While waiting for another mic to be positioned and tried, the other mics in the room were briefly opened. The sound of the guitar spill on the AKG *D20* bass drum mic seemed promising. So it was tried but only sounded right when facing away from the guitar amp. A large piece of foam was cut and placed over the front of the mic and we worked only with the rear facing the amp which had to be turned up a little more. The off-axis response contributed considerably.

I have followed this philosophy quite extensively. Unfortunately, it leads to two problems — firstly, you never reject any microphone as worthless always feeling it has to be of some use. Secondly, your mic collection looks like junk and you get laughed at.

A few years ago I was using an old tube Neumann *U47* on a couple of projects. I got to know the sound of the mic quite well using it mainly for vocals and the occasional overdub. Normally, for vocals it was run with the head pointing upwards. For overdubs it was more normally suspended with the head pointing down. Sometimes for speed, the mic was left with the head down for vocals. I always felt that there was a slight difference in character of the sound dependent on whether the mic was up or downwards pointing.

I thought nothing more of it until about a year ago when Sony launched their new tube mics, in particular the *C800G* with its externally mounted tube and the use of the Peltier effect to reduce its operating temperature. With the

tube running cooler, Sony have been showing plots for small but significant improvements in distortion across the frequency spectrum as well as suggesting other parameters benefit from the cooler running.

I hesitate to connect my feelings about that *U47* with anything even vaguely related to Sony's findings but I would like to ask the question. If there is a difference in performance dependent upon the operating temperature of the tube, could it be that the tube in a *U47* runs at different temperatures whether run head up or down? It is not an effect that I have had the opportunity to investigate closely enough with any other tube mics. Any one else experienced this?

There is, of course, another suggestion. With the mic head up, heat will rise from the body and raise the temperature of the capsule area and surround. This heat would reduce the chances of any condensation in the capsule area and grille. With the mic head down, the capsule area is much cooler. Any comments?

The affect of humidity on mics can be quite marked and should not be ignored. Vocals of any type lead to a great deal of warm moist air leaving the mouth and it has got to go somewhere. If the mic is right in front of the mouth there must be some degree of affect.

The degree of change that humidity and temperature can bring was brought home to me when towards the end of a small orchestral session — about 30 pieces in a studio that was not quite big enough — it was decided to try an alternative bridge section on the title that we had commenced the session with. It was just impossible to match the two sound characters even with the musicians playing the same parts. There had been a significant drop in the brightness of the strings and the sound was dull in comparison. We had been unable to use the air conditioning during the session and the humidity just built up.

This was an extreme case and stringed instruments including pianos react quite strongly to humidity changes anyway; even without HF attenuation from the air and drops in mic performance. But sometimes when for some reason that you cannot figure out, something sounds dull and lifeless, consider the possibility it may be the humidity. ■

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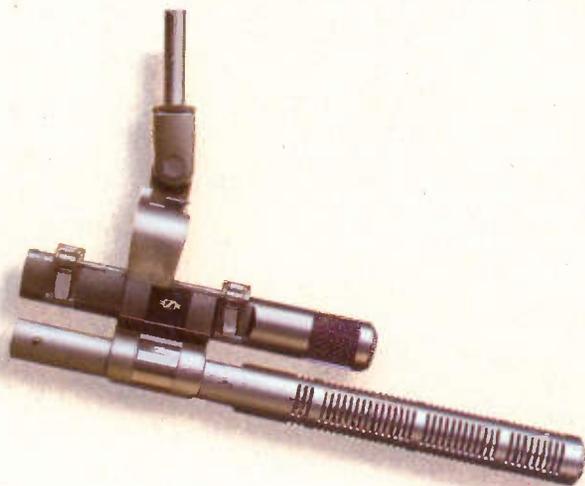
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