DAWs
The kit and the market

EXCLUSIVES

Steven Spielberg's *Twister*
ATC and The Ring cycle
Audio Technica mics
MTA Intermix

LIBRA
AMS Neve bids for digital project market

The Mike Hedges Interview
Traditionally, sound engineers have had to combine loudspeakers and amplifiers, often from different manufacturers, for optimum performance.

From time to time, speaker designers have had the idea of combining the two for specific applications.

Now Tannoy have brought their unique driver technology and years of studio experience to active monitoring, by creating the AMS8.

The AMS8 has been designed to meet the exacting demands of recording, broadcast and post-production studios.

For the technical, it has a 200mm point-source, dual concentric driver, two powerful built-in amplifiers and adaptable active filters.

For the non-technical, it looks as good as it sounds.

The new AMS8 - makes all the others seem pointless.
Editorial  Tim Goodyer seeks rehabilitation from music addiction

Soundings  Reports from the US NASC show and the Sony Radio awards, BASF's own award for excellence and Studio Sound's BIMA sponsorship

International Columns  Europe, USA, Far East - news and comment columns on DVD, touring in Asia and the US ad industry

World Events  The exhibition season is in full swing. Check your diary against Studio Sound's exhaustive events calendar

AR Studio/Facility  The setting behind Rio's top recording studio complex may be beautiful, but the politics and legal requirements that accompany it are complex

The Ring Cycle/Recording  Bringing a surround recording of Wagner's Ring Cycle out of the vaults and into the digital is guaranteed to be a fraught and eventful process

Twister/Postproduction  Steven Spielberg's latest blockbuster demanded an exacting soundtrack; Studio Sound demanded an exacting account of its construction

DAWs/Recording  A comprehensive survey of DAWs and their place in audio, postpro and broadcast

Op-amps/Technology  An update on IC op-amp technology and its place in pro-audio equipment design

HEDGES INTERVIEW
Over 20 years at the top of pop: versatile pop producer Mike Hedges gives an exclusive interview to Studio Sound

REVIEW SECTION

27 Amek DMS  Amek targets the middle digital-console market with its Digital Mixing System
31 A-T Artist series  A mic package intended to meet most studio situations
33 MTA Intermix  British console manufacture adopts a modular strategy
36 Aphex Model 109  A versatile American equaliser bids for recognition
38 Fostex PD4  The latest portable DAT recorder from Fostex
41 New Technologies  A focus on the new equipment launched at the recent American NAB Convention

COMMENT

13 John Watkinson File  The agony and the ecstasy of audio trade shows
76 Broadcast  Digital electronics and its expanding sphere of influence
87 Rocket Science  Tracking the development of digital audio workstations
106 Open Mic  Ben Duncan on the destructive issue of subsonics - and the means to control them

20 AMS Neve Libra  The digital-console innovators target the serious music project recording market

START PAGE 20
Choose The Look You Like

The D series of Q-G® connectors offers a choice of satin, pebbled, or black metal finish for panel or chassis-mounting. Choose from 3 to 7 contacts. Shown above left to right: D3F (pebbled), D3FS (satin), D3M (pebbled) and D3MS (satin). For black finish order D3MB or D3FB.

Request Switchcraft's AVP-3 catalog for more information. Call +44 (0)1705 661579 for product pricing and delivery.

Patch Cords In 6 Colors

Switchcraft® audio patch cords feature 3-conductor, .173" diameter telephone-type (TT) plugs and are available in a variety of colors and styles. Choose black, red, yellow, green or blue as braided or overmolded, gray is available as overmolded only.

Request Switchcraft's Molded Cable Assembly and Patch Cord Guide for details. Call +44 (0)1705 661579 for product pricing and delivery.

Durable Q-G® Audio Connectors

Preferred by audio professionals world over, Switchcraft Q-G® connectors, such as the A3M, A3MBAU, A3FBAU and A3F (shown left to right), feature unsurpassed durability with a choice of finishes and contact platings. High performance inserts are available in Switchcraft® green or black with gold-plated or silver-plated contacts. A rainbow of colored flex reliefs also available. Solder terminals rotated for easier access and soldering.

Request Switchcraft's AVP-3 catalog for details. Call +44 (0)1705 661579 for product pricing and delivery.

Rugged Switchcraft® Jack Panels

Switchcraft's new TTP96 Series Jack Panel (shown in photo) is built to last. It features corrosion-resistant nickel-plated jacks, a steel frame for superior jack life and an aluminum, black anodized face and cable support bar. Switching arrangements available in full normal, half normal and open circuit. Fanned-solder terminals make solder connections simple, and an offset ground terminal makes common ground bus connection easy.

Request NPB #448 for the TTP96 Series. Call +44 (0)1705 661579 for product pricing and delivery.
Lost in music

Back in my gigging days, one of the first lessons I learnt alongside P6 (for those who don’t know: Proper Preparation Prevents Piss-Poor Performance) was that too little was invariably better than too much. A short set that left the punters hungry for more was likely to ensure that they came back next time, whereas a long one that left them sated was not. As musicians, we were enticing our audience to develop a taste for music that only we could satisfy. In short, music is a drug, and if you play music you’re a dealer.

But the music habit is more sinister than this—if you’re pushing music, you’re already hooked on music yourself. There’s a classic case study: one of the marks of a good pop song is that you want to play it again. Somehow the music makes you believe that you need more of it and it’s this very quality that drives most of us to pick up an instrument in the first place. First we learnt to play a song we loved—badly and in a bedroom. We’d never heard it sound like that—at a stroke we had reduced something of mystery and beauty to an abhorrent shambles. It was a shameful thing to have done but it didn’t stop us from doing it again. And again—with friends and in a bedroom. Now we shared a dirty secret and we needed to make amends, we needed to restore music’s dignity. We didn’t know it was all part of the plan.

But there are other routes into music addiction that extend its influence outside of musicians’ circles and they all work through technology. The same technology you use every day. There are those, for example, who never mastered an instrument and had to settle for some other form of musical fix. To these, music first offered remixing; let somebody else provide the raw musical material, they reasoned, and you’ve got a form of vicarious musicianship and another addict.

More recently, music sought greater numbers of victims through MIDI. Here was a technology that allowed a generation of music enthusiasts to feed their addiction to music without the drudgery of learning to play an instrument. And now music is looking at interactive media since it has the potential to offer even greater numbers of weak-willed nonmusicians the same thrill that hooked you and me.

At every stage of music’s development, the levels of playing skill and affluence necessary to become an active music addict have fallen. Music had us strip away the need for musicianship through expensive technology and then it had us reduce the cost of the technology.

Perhaps it’s time to recognise that music is like a drug. But unlike most other potentially addictive drugs, prolonged usage does not necessarily cost you your wealth and your health. In fact, music comes from a family of drugs and that the next is already on its way—it’s called video.

Don’t look for help because there isn’t any. There are no counsellors waiting patiently to answer help lines. There are no discreet meetings taking place late at night where we can confront our weaknesses together. Instead there are the hi-tech shrines that we call studios of one sort or another in which we satisfy our needs. And the magazines that reassure us we’re not alone in our addiction. My name’s Tim and I own a Minimoog...
Interactive initiative

STUDIO SOUND is proud to announce that it has become a Media Partner in the forthcoming British Interactive Media Association (BIMA) Awards. The recruitment of some 15 commercial sponsors—including Philips Media Professional, Sonopress, Mayking Multimedia, The Independent and Studio Sound's sister title Data Production International—represents part of BIMA's 3-year programme to develop the Awards as a major platform for showcasing the UK multimedia industry.

BIMA's Jane Callaghan commented: 'It is essential for UK multimedia producers that national and international business markets, and the general public, clearly understand the value, talent and content of what we are producing.'

Presented as part of the forthcoming Multimedia 96 exhibition at London's Business Design Centre, the 1996 Awards have seen a steady increase in interest to date—almost 200 CD-ROM; CD and Web-site products and media titles are competing for a total of 17 prestigious accolades.

'This is the largest number of entries we have received in over a decade of the BIMA Awards,' confirmed Jane Callaghan. 'BIMA is a nonprofit initiative operated by the industry itself, not a device for any event of publication. Clearly, the BIMA Awards are seen as the UK multimedia industry's main platform for recognition and achievement.

'This year's awards demonstrate that, although consumer multimedia continues to boom and garner the headlines, corporate use of multimedia is now widespread and still provides the bread-and-butter revenue of a large number of UK developers. Many applications in the Business category this year were also very inventive and clearly some of the most creative design today is finding its way into corporate programmes.'

Specifically, Studio Sound is sponsoring the Best Production Award for Sound and Music—in keeping both with the magazine's history in the pro-audio industry and in response to the convergence of recorded media. Through this initiative, Studio Sound is seeking to support BIMA's interest in furthering the interests of, and stands in, the emergent field of 'multimedia'. The entrants for this category are forwarded by the judges from the other categories where it is deemed that use of sound and music is particularly well conceived and executed.

The winning entries and the finalists will be featured at the BIMA Awards Showcase which is part of the Multimedia 96 event, on the morning after the Awards presentation. This special viewing area is being constructed and fitted with over 30 workstations, so that Multimedia 96 visitors can try out the CD-Roms, CD and Web sites for themselves. The finalists and winners of the Awards for the best in multimedia production and publishing will be the subject of a unique snapshot view of the best in the UK multimedia at the Multimedia 96 exhibition. The presentation of the final four short-listed entries for each award, plus the announcement of the winner, takes place before 700 leading figures from the UK multimedia industry attending the black-tie dinner at the Park Lane Hilton, London, on 17th June 1996.

The Multimedia 96 exhibition, featuring the BIMA Awards Showcase takes place the following morning. Callaghan continues: 'Visitors to last year's Multimedia show reported that they found the BIMA Awards showcase very useful. Those new to multimedia said it was an easy introduction to multimedia production and more seasoned practitioners were interested to see what was being highly regarded.

We are delighted to repeat this opportunity for Multimedia 96 visitors to take the UK's leading multimedia products through their paces. We hope that it will act as an inspiration and encourage others in the UK to take part. The UK is in a strong position to become a leading region for multimedia production and the BIMA Awards are designed to support the potential for international success. BIMA can be contacted on: Tel: +44 1733 245700. Fax: +44 1733 240020.'

TIM GOODYER

ESCAPING an undignified demise, British console manufacturer Raindirk is set to 'make a new start'. The Belgian Ampvect operation has teamed up with a number of private investors to buy all Raindirk assets which, with key members of the previous staff, will form the basis of a reorganised company.

The Symphony line of consoles will be continued, along with three new models: the Iceni music-tracking desk; the OB live-and-location broadcast desk; and the Montage film desk. The new alliance will also see Raindirk participating in the manufacture of Ampvect's new digital console.

Raindirk, UK: Tel: +44 1366 382165.

THIS YEAR'S SONY RADIO AWARDS brought together a host of the glamorous and talented souls who make the British radio industry the envy of the world. Although under attack from changing broadcasting legislation, the standard of programming was in no doubt as the list of categories and nominees mounted.

Details of the winners aside, the occasion demonstrated that quality of both programming and production was high on the priorities list as evidenced by Radio Awards Committee Chairman, John Whitney's speech which noted that, 'Unlike television, we do have this commitment to sound broadcasting'. Accepting the award for Station of the Year, BBC Radio 5 Live's Controller Jenny Abramsky further commented that 'Radio presents better pictures than television'.

The event's Gold award went to Richard Baker, the Specialist Music Programme award to Andy Kershaw for Kershaw in South Africa, the Phone-in/Debate award to Jonathan Dimbleby for Any Questions and the Documentary Programme to Maura Clarke for War and Peace. John Whitney also received a Radio Academy Fellowship.

MAGMasters, the London-based postproduction house, has been sold following the company going into receivership in September. The collapse, that was widely anticipated by the post-production community, was attributed mainly to financial problems at the company's ill-fated Californian branch which closed earlier this year.

'The Burbank facility should have acted as a booster rocket for
Magmasters, but instead it turned out to be the brakes,' stated Magmasters Director Fred Rowe. "Problems with early management and damage caused by the 1994 earthquake contributed to the studios becoming a drain on resources, adding to severe cashflow problems in the UK."

Magmasters' assets have been bought by graphics and display company, Photobition Group plc, and broadcasting services worldwide and has already acquired Optimods at transmitter sites in Wertachtal, Nauen and Jülich.

Orban, US: Tel: +1 510 351 3500. Deutsche Telekom, Germany. Tel: +49 52 22 13 225.

The Western Australian Houses of Parliament has taken a selection of ARX active MX2 EMX mic splitters, Afterburner we...
in what appears to have been a seamless acquisition. Photobition will continue to run the 9-studio Soho facility and periphery businesses, now collectively known as Magmasters 3, with all existing staff including former Directors Fred Rowe and Steve Cook who have been appointed joint Managing Directors of the new company.

'The future should be very good for Magmasters,' said Rowe. 'Being in public-company ownership means there will be plenty of capital to put meat back on the bones as well as expand the business. It will also free-up Steve (Cook) and myself to actually run the company and go out and acquire new business.'

The demise of 14-year-old Magmasters Ltd, leaves a number of unpaid creditors, but according to Rowe 'material amounts' are not involved. 'The encouraging thing is that the vast majority of creditors have been very supportive for the future,' he commented.

'I think the industry realises that people have a bit of bad luck from time to time and it's up to everybody to rally round and help companies get off their knees and back into business as quickly as possible.'

Commenting for Photobition, Chairman Eddie Marchbanks said: 'Magmasters has gone through a period of stagnation over the last 18 to 24 months, but we're eager to get right behind it now and invest a lot of money to give it the push it needs. Magmasters fits very well into our business area and we're delighted to be part of what we consider as an exciting business with great potential.'

PATRICK STAPLEY

THE NORTH AMERICAN sound-contracting industry is in transition from the niche of sound system installation into the wider world of systems integration. Many sound contractors are now installing low-voltage systems, such as data, telecommunications, video, security, to ensure their business has a broad, firm footing.

Over the past few years the National Systems Contractors Association has broadened its annual exhibition to include these facets of installed electronic equipment and systems. The recent 1996 exhibition was the largest event in the history of the NSCA with 8000 registrants and over 480 exhibitors attending the St Louis, M-O Convention Centre.

The presence of companies from the security,
DEADLY ACCURATE. BRUTALLY HONEST. 
THE BEST STUDIO AMPLIFIERS YOU'VE EVER HEARD.

What you hear is what you get. 
A rule to live and die by in the studio. A rule too many other amplifiers tend to forget. That's why we're introducing the new Studio Reference Series.

Our Studio Reference 1 and 2 are simply the most sonically accurate amplifiers you've ever heard. No added coloration to skew your mix. Excessive headroom to handle even the most dramatic transients. Incredible damping for a tight, defined low-end. And noise that's so low, it's hard to measure and impossible to hear.

In short, the Studio References are the best amplifiers for super-critical evaluation in the studio or home. And, they're backed with Crown's exclusive Three Year Full No-Fault Warranty.

If you're ready to audition the most accurate studio amp you've ever heard, contact Fuzion PLC. 2 Lyon Road, Walton-on-Thames, Surrey KT12 3PU. Tel: 01932 882222, Fax: 01932 882244.
residential, telecommunications and data did not distract most sound contractors from seeking out the latest audio gear; although this, too, is in translation. An aspect of this trend was exemplified in the most talked about new product at the show, which was entirely software based. Smarta is a new time-domain FFT-based audio measurement system from JBL Professional that focuses on the measurement of audio systems. The US$695 software includes two modules: one for real-time measurement of system response using a variety of signal types including programme audio; and a disk-based analysis tool for measuring the impulse response, magnitude over time, reverberation measuring the impulse response, types including programme audio: time includes two modules: one from JBL Professional that focuses based audio measurement system about new product data residential, telecommunications and.

Other innovations in the measurement of audio came from two companies already known for measurement equipment. The fasts electroacoustic analyser from AudioControl Industrial was created specifically for the sound system installer (or roadie) to make the critical measurements required to setup a sound-reinforcement loudspeaker system without the level of knowledge previously required to make accurate time-domain measurements. Direct read-outs in simple language make setting crossovers, equalisers and limiters into a go/no-go process with the sophisticated measurements buried behind simple menu-driven tests. The unit can also be used for driver and cluster alignment, polarity checking and delay setting. The well-known TEF analyser from Crown International has been refined into a battery-operated, hand-held, LCD touch-screen unit with that is about the size of the previous model’s user manual. Weighing less than two kilograms, the new analyser is based on the same DSP as the TEF 20. The TEF PAD currently provides ANSI standard third-octave and one octave, real-time, analysis, but will eventually support the full range of time-domain TEF measurements.

DSP-based signal processors were shown in a variety of packages and applications from the all-encompassing Peavey MediaMatrix to even smaller packages including the Miniframe and X-Frame formats and QSC Audio’s MSP series that will offer multichannel rackmount processors for sound-reinforcement applications. There were also DSP-based products shown to their infancy to a chosen few in back rooms. These units will be chasing after the market of the mature TOA DACsys II loudspeaker processors, as they become available over the next year.

The NSCA Expo has always been a loudspeaker exhibition and this year featured two approaches, innovative designs and me-too concert systems. Community introduced their new M4 mid-range driver with diaphragm constructed of carbon-fibre in a resin compound. Reikius-Heinz introduced new TRAP-series array boxes that offered significant reduction in destructive interaction between devices plus low-frequency pattern control by frequency-shaping multiple large drivers. There were also a surprising number of companies claiming to have products competitive with EAW’s 850 series of concert-sound loudspeakers, including the unlikely entry of Altec Lansing into this competitive end of the loudspeaker business.

Although sound contractors in North America may becoming more interested in the other aspects of the installed electronic business and becoming more involved in software-based systems, it appears that the demo rooms playing music through a wall of loudspeakers drew the biggest crowds at NSCA Expo 96.

WADE McGREGOR

Right First Time

B&K 4004 The microphone capable of recording the launch of the space Shuttle: hostile conditions on the launchpad, flames and chemicals showering the microphone and SPLs reaching 170dB.

B&K 4006 The microphone which survived -45° to record ambiences in the Arctic: the nickel diaphragms of the B&K omnis resisted the cold, faultlessly recording winds of up to 90km/hour.

B&K 4011 The microphone that has to capture faithfully the sound of a violin worth £1.3 million: wherever Nigel Kennedy performs, he takes his 4011 with him.

B&K 4040 The microphone that combines solid state and tube technology to provide the definitive vocal mic: with only 100 units being made, one investor has locked two away in his safe.

Demanding environments need B&K’s. Demanding engineers choose them.
True sound brilliance is often defined by its acoustic clarity. Artful and uncompromising engineering bring this pure sound to life, enabling an entire array to sound like one speaker, focused on a single point.

With Meyer Sound, you only have to listen.
One-Stop Digital Processing

Penny & Giles’ future-proof Audio Multiprocessor combines many exceptionally high quality processors in one flexible unit, to save you time, space and money.

- up to 16 channels of real time processing
- with multiple independent processors in each channel
- plus user-defined internal routing for unique configurations
- offering extraordinary levels of control
- massive headroom from 32-bit floating point processing
- with unique algorithms for excellent sonic quality
- 24-bit digital or 20-bit A/D/D-A
- remote control via RS422 & MIDI
- choose from the expanding range of Pythagoras Audio Software, including Dynamics, EQ, and dedicated application packages

Illustrated (from top):
DC16 Digital Controller
PP10 Audio Multiprocessor
PP20 Audio Multiprocessor
PP20R Remote

Penny & Giles GmbH
Mauthstrasse 9,
85049 Ingolstadt, Germany
Tel: (0841) 935030
Fax: (0841) 9350331

Penny & Giles Incorporated
2716 Ocean Park Boulevard
# 1005, Santa Monica, CA 90405, USA
Tel: (310) 393 0014
Fax: (310) 450 9860

Penny & Giles Studio Equipment Ltd
Blackwood
Gwent NP2 2YD, UK
Tel: +44 (0)1495 228000
Fax: +44 (0)1495 227243

www.americanradiohistory.com
Only a matter of time

The density of trade shows is rapidly approaching critical mass. What are the benefits and the costs—and what if the industry refuses to say no?

What I might loosely call the trade show enjoys a long tradition in, and offers a number of vital services to, our industry–I use the term loosely because I want to embrace both conferences and conventions. In deciding whether to attend a show either as a visitor, a presenter of a paper or as an exhibitor it is obviously advisable to assess the potential benefits. Here I have tried to categorise these benefits to see if they represent good value—whatever that is.

There are two distinct types of information which circulate at shows: theoretical information about the state of the art, and practical information about available products. Academic success is measured by presentation of results, and so researchers are forced to give papers at shows. Business success requires—at least—that manufacturers bring new products to shows. Given these considerations, you regularly meet the regrettable polarisation where certain academics regard the presence of 'new kit' and the implicit manufacturers' profit motive as a threat to the purity of their research. Certainly, some manufacturers are purely interested in shifting boxes and scorn the 'egghead' contingent for having its head in the clouds.

Both camps are sadly wrong. The academic is increasingly forced to justify the host of his or her work and to find someone who will provide the necessary funding. Just as telling, is that the company which conducts no research will not be around for very long. It is only a matter of time before today's theoretical breakthrough becomes tomorrow's product. Equipment users are trying to make a living and need hardware to deliver what their own clients require. These users don't want technology per se; they want solutions to practical problems. In other words, what's in the box is irrelevant as long as the box does the job. The smart manufacturer will identify a new technology as a better solution and incorporate it in a product having a commercial edge. Consequently, I prefer shows in which there is a balance between academic and manufacturing interests.

The date of a forthcoming show focuses the mind as it approaches. If a new product is under development, the appearance of that product at a particular show becomes a development goal. Without that goal, the development of products is readily protracted. Refined applications are continuously added—perfection becomes the enemy of the good. A show also serves a vital marketing purpose where users can request hitherto unavailable products and manufacturers can suggest possible new products, or demonstrate prototypes to gauge reaction.

On a personal level, a show presents a good place to keep in touch. I know a small number of critical places in various cities around the world—if I stand in one of these places at the right time, everyone I want to see will go by.

SO FAR, then, a show offers nothing but good. Clearly, without trade shows, we would be disadvantaged. However, attending a show is expensive. For the attendee, travel and accommodation are obvious expenses but less obvious is what I call 'lost opportunity': the work an attendee does not do because he or she is at a show. Shows are even tougher for a manufacturer. Floor space is particularly expensive and the stand itself has to be constructed; then there are shipping costs for equipment, graphics, travel and accommodation for the staff, meals, rental cars, taxis... The list is long. A major manufacturer may spend £0.5m to maintain a substantial presence at a show.

Now, if attending that show generates £1m, the manufacturer is winning; if the show is well attended, the organiser is winning because everyone wants to exhibit at a show that everyone attends. The host city is winning too—a significant amount of show 'spend' goes directly into hotels, restaurants, taxi services and, of course, the conference centre.

Unfortunately, this all-win situation has been allowed to drift out of our grasp. It's easy to see why. Originally, shows were organised to benefit the industry but now the motives are more numerous. As far as the city, the organisers and the convention centre are concerned, the more shows, the merrier. For them, shows equal income. This is a false assumption as there is only so much interest generated in a year—whether in terms of research or equipment. This is independent of the number of shows.

Indeed, more shows equals more expense for exhibitors and attendees alike. From the attendees' standpoint, direct expenses and lost opportunity problems mean that attending an ever-increasing number of shows is out of the question. The problem then is which one to attend. And what if the people you expect to meet are at a different show...

From the exhibitors' standpoint, the proliferation of shows is a serious problem. Many companies now have significant numbers of staff who do nothing but organise show appearances. The cost of maintaining a presence at all of these venues is such that it has raised

From the exhibitors' standpoint, the proliferation of shows is a serious problem

the purchase price of many items of equipment. Why should end-users pay over the odds for their equipment in order to support a local building industry?

One of the reasons that the 'tail' is now bigger than the 'dog' is that a single manufacturer is powerless to change the situation. No-one wants to be the first to stay away from a show in case they give away an advantage to a competitor. However, the signs are that this situation cannot last. It only requires a degree of cooperation between manufacturers to identify these shows which are parasitic rather than beneficial. The actions which might then be taken do not need spelling out. I believe this is more a question of 'when' than 'if'. Can our industry afford to neglect a simple opportunity to cut costs and increase profitability for both manufacturer and user in these stringent times?
THE LEGEND CONTINUES

We will take you to a new dimension of sound.
No more noise or hum.
We create the new standard in microphone technology - pure on stage, perfect in the studio and best precision for broadcasting.

You just concentrate on singing, speaking, playing - we take care of the rest.
Check them - they offer spectacular value for money!

TB - 94
the tube
"AS REVIEWED IN STUDIO SOUND APRIL 1995"

The first tube mic without any unwanted noise.
Featuring a new designed valve with high performance, high output and the richest sound a tube mic can offer.
Comes complete in aluminium flight case with cut foam interiors, flexible suspension, power supply and cable.

CONTACT YOUR LOCAL DEALER OR SEND YOUR REQUIREMENTS DIRECT TO OUR SERVICE DEPARTMENT. DISTRIBUTORS FOR SEVERAL COUNTRIES DESIRED

B.P.M.- STUDIOTECHNIK
WATTSTRASSE 11 - 13, 13355 BERLIN
TEL: + 4930/4631169 FAX: + 4930/4631216

www.americanradiohistory.com
Tell her about it

From its early days of serving the advertising industry, the recording-studio industry has become one of its most enthusiastic clients. But is this exposure to hype and hypocrisy pushing the studios off track asks DAN DALEY

There was a time when the relationship between the US recording industry and its advertising industry was quite different. Up until sometime within the last decade, the former was best regarded as a tool for the latter. And the former was quite happy about that situation. Who wouldn’t be?

Advertising agencies routinely and unflinchingly paid top-of-the-card rates, billing costs back to their own clients with the requisite 17.65% value-added tagged on; agencies consistently wanted to work during the daytime, specifically the morning hours, usually, leaving studio owners with plenty of afternoon and evening hours for music recording clients who were far more prone to haggling but who were the raison d’être for being the studio business in the first place. But in the wake of the personal recording technology phenomenon, studios suddenly found themselves bereft of these very lucrative and, until relatively recently, reliable clients. Much of the advertising world has embraced composers who are also writing them. Personal recordists generally work more cheaply and there are more of them than there are studios. The upshot of this turnabout is that recording studios’ interest in advertising is still as a source of revenue, but in a very different manner.

As I write this, I’m surrounded by sheaves of paper: brightly coloured, thick-gauge stock with brilliant 4-colour photos and nicely turned graphics and copy extolling the benefits of working at a particular studio. But, in true American style, this is not mere advertising. At a time when studios feel themselves to be quite literally under attack from changing technological and market forces, they have responded in a manner that would make Phineas T Barnum proud. Here’s just a sample of what has come through the transom in the last few months.

New River Studios in Fort Lauderdale, Florida, offers a bright and inviting brochure, one whose first two pages proclaim ‘Beaches, Shopping,’ and whose introductory copy cites the studio’s proximity to theatres, dining, recreation and museums, as well the facility’s accessibility to the nearby river with its boat docks. The listing of the studio’s audio capability (which is quite formidable) begins on page three.

The brochure for Nashville’s October Studios, done in the form of a CD insert, gets to the technological meat a bit sooner, but one’s eyes are more instantly grabbed by an exotic (arguably erotic) background done in Oriental reds and similar tints, featuring artwork from within the studio whose graphics (in the brochure, anyway) tend to win the competition with the photos of the equipment.

The brochure for Kingsway Studio, the private-commercial facility owned by Producer Daniel Lanois in New Orleans, would rival one from the Metropolitan Museum of Art. The artful photographs initially stress the antebellum house’s interior and the manner in which the equipment is integrated into it, before moving into the realm of quasi-impressionistic, with nude-as-lamps in one of the bedrooms and a Picasso-esque rendering of a nude juggling fruit in another.

Pilot Recording’s brochure is positively prosaic compared to that, a four-pager with nicely-fit shots of the meat-and-potatoes elements of the New York studio. But the Wired magazine-like graphics of the equipment insert reflect that studio’s concession to the ‘style’ part of the style-vs-substance equation.

Recording Arts’ brochures make up in frequency what they may lack in artistic detail. Owner Carl Tatz tends to use every minute not spent on the phone soliciting new business in devising new contexts in which to convey his core message, ‘What a Great Studio’

Each one of these studios is a very good, with top-notch equipment and personnel; each one of these studios has come to the conclusion that simply being a good studio is no longer enough in a marketplace that is both crowded from below with ADATs and increasingly global in nature. Each one of these studios now has a relationship with advertising in a manner in which this industry has never before seen.

The brochures (and a few newsletters, another burgeoning tactic) are handy for my purposes at the moment. But the proliferation of studio web sites almost obscures them. For the most part, the web-sites are not nearly as inventive as their printed cousins nor necessarily any more effective (give them time, though). But taken in sum, along with a marked increase in studios taking print advertisements out in both national trade and local music and post magazines, these efforts represent something else: a level of creativity—you might even say a conduit for creativity otherwise, perhaps, untapped in an age of preset parameters—that subliminally illuminates each facility in ways that otherwise might have gone unnoticed. Like creative-writing exercises, anything that forces you to regard a familiar situation in a new way encourages a new perspective on it.

Necessity, in the case of studio owners who do not aspire to become freelance writers, has provoked interesting inventions, indeed. Advertising’s effectiveness will naturally vary from one studio to the next, from one region and market to the next. But the fact that so many American studios have come to employ it so intensively in such a short time reflects more on their American-ness than on the implicit value of advertising. In a culture built on myths—from the western pioneers onward—it’s natural to want to participate in myth-making. And advertising—as it has been defined and refined by Americans themselves—is a natural way to myth authorship. And in creating one’s own myth, one enhances oneself. Once upon a time, you were as good as who recorded in your studio, or as good as your equipment, or maintenance or engineering talent. We live now in an age in which you might also be as good as your advertising. And that might not be all bad.
When Philips first demonstrated CD in Eindhoven in the late-1970s, it was a 14-bit system and the disc was smaller than the 12cm discs of today. 'Make it larger to hold a longer playing time, with 16-bit resolution,' a very few of us begged. We were scorned for daring to question the 'magic carpet ride' sound of CD which seduced first-time listeners.

Philips teamed up with Sony and the disc size was increased and the code set at 16 bits. With hindsight we should have argued for a flexible system. The first players resolved far fewer than 16 bits but when D-A converters finally caught up with the standard there was nowhere left to go; 16 bits is the ceiling. So studios must down-convert from 16-bit, 20-bit or 24-bit recordings. Systems like Sony's Super Bit Mapping make the best of a restriction that, with hindsight, should never have been imposed.

There are two ways of looking at the efforts now being made by Europe's Acoustic Renaissance for Audio to set standards for a new generation of high-density disc. The short-term view is that because Toshiba, Thomson and Time Warner are hell bent on launching DVD movie players later this year, without industry-wide software support, the system will flop. Consumers are now very unforgiving. Like a joke that falls flat on the first telling, there is no coming back for a relaunch if the first sales pitch fails. Without a kick start from the movie application, audio-only DVD will never have a chance.

The long-term view is that even if DVD fails because it is launched too early, and at half-cock, the format will be a roaring success with the computer industry as a high-density CD-ROM. Recordable DVD will be a wonderful high capacity backup store for hard-disk data. DVD may then sneak into the living room as a consumer player that plays movie discs without the needing a PC. The scene is then set for DVD to become a high-density audio-only carrier. So in forcing the DVD standards group to think ahead about future audio applications, the ARA is on a Mission from God.

Last October the ARA, lead by Bob Stuart of UK hi-fi company Meridian, went to Japan to talk to the Advanced Digital Audio Conference, a subcommittee of the Japan Audio Society. The Brits had three clear messages: an audio-only version of DVD should not use lossy compression (like PASC, Musicam, AC-3 or ATRAC). Coding should be flexible, with first-generation players always able to play future-generation discs, albeit with less resolution than future-generation players. The system should also be capable of handling multichannel sound, but with baseband stereo always available from m/c discs.

The fact that Europe had to go to Japan to talk about future audio standards tells us how much things have changed since Philips made musicassette and CD the new music industry carriers. Note, too, how the new high-density disc is not even called a CD.

The fact that Europe had to go to Japan to talk about future audio standards tells all you need to know about how things have changed since Philips made musicassette and CD the new high-density disc and no longer even called a CD.

new music industry carriers. Note, too, how the new high-density disc is not even called a CD.

**THE CHALLENGE**

To the ARA's approach came from Sony, with the Direct Stream Digital ('bitstream') system which uses a very-high-speed stream of single bits instead of the long PCM words favoured by the ARA. Matsushita has proposed a system which is similar to DSD, but uses 4-bit words for the bitstream. After a clumsy start, Sony 'clarified' the DSD proposal, saying that the system was developed for archiving, and DSD releasing is a distant concept. Doubtless this clarification was not unrelated with the fact that all the record companies, including Sony Music, are still watching sales of conventional CDs rising. The last thing they want to see is a consumer scare triggered by the promise of better CDs just round the corner.

In mid April, the ADA agreed a bullet-point list of recommendations. This read as a straightforward endorsement of DSD, with bitstream coding to be used both for archiving and consumer release. Japanese sources confirm this. But the ARA has a more optimistic view. This came through at European industry seminars held at the end of April at Harrogate, in the North of England.

The ARA expects to see a separate list of bullet points for release media, to supplement the first list which refers only to archiving. Says Bob Stuart: 'The specification is workable. And he is happy with 'two victories'. The ADA proposal does not rule out multichannel sound and it recommends lossless coding.

Stuart acknowledges the help of both Pioneer and Philips on winning the lossless code recommendation, adding, 'We are absolutely happy about the use of DSD for archiving, but only for archiving because it takes up three times as much data space as PCM'.

All this has been achieved, says Bob Stuart wryly, 'while the AES is still having meetings about who is going to be on the committee to discuss the issue—by the time they have decided, it will all have been decided'.

'We don't understand the politics of the Japanese standards process. But if we did nothing there is a risk that a new generation will grow up thinking that music is video with AG-3 compression.'

The music industry told us that they only wanted Red Book time, 80 minutes per disc. They have enough difficulty filling a CD with music already. They complain that they are not being consulted on plans for a new format. Well, what I say to them is Edison did not consult with recording engineers'.

By exploiting the variable data rate which DVD uses for MPEG picture coding, lossless packing can save between 30% and 40% of disc space. The ARA wants eight channels of sound on the disc, at anything between 16 and 24 bits.

The time scale now is that the ADA will put its recommendations to the DVD Committee's Audio Task Force. This group will then take a year to come to a decision. Says Stuart: 'The fact that the audio specification will be not be agreed before the launch of DVD does not matter as long as there is a digital output or hose on the rear of the player which can deliver whatever signal is on the disc'.

The only immediate action needed is for the DVD Committee to agree on the use of two digital flags which the player will use to distinguish between video and audio discs.

If this happens, predicts Stuart, 'DVD can be the last format'.

---

**EUROPE COLUMN**

**DVD: the final format?**

The history of CD can be presented as a catalogue of poor judgement and missed opportunities. Can DVD fulfil its promise asks **BARRY FOX**

---

---

---
How do you improve on the most successful professional multitrack tape recorder of all time? Listen to your customers. Do some heavy thinking, and...

Make the transport four times faster and put it under constant software control. Incorporate advanced onboard digital editing with track copy, auto punch, track delay, tape offset, 10-point autolocator, rehearsal mode and more. Use the latest oversampling converters for the ultimate in digital audio quality. Design a beautiful vacuum fluorescent display that provides all the critical information. Wrap all this well-thought-out technology in an utterly professional six-pound solid die-cast aluminum chassis. Of course, make it 100% compatible with over 70,000 ADAT’s already in use worldwide. Introducing the new, definitely improved ADAT-XT™ 8 Track Digital Audio Recorder. Consider it a think tank for your creativity. See your Alesis dealer. Don’t think twice.
Walking the Dragon

The tide has turned on the regional divides that have traditionally dogged the music industry of the Asia-Pacific region, writes JIM JAMES

When John Rule came to Asia to seek his fortune in 1987 he found a place that was on the verge of an explosion of business in the sound-reinforcement market. But, as many others have found, exploiting the potential of the Asian market is about more than just being here.

John grew up in London and worked at Rak Studios doing all the unglamorous jobs, and soon discovered that getting out of the claustrophobic studio and living on the road setting up gigs was infinitely preferable. John was introduced to the techniques for rigging live sound and production by Smudge and Tim Summerhayes of Rak Mobile on the Pink Floyd's 'The Wall' concert, and well remembers the huge stack of Crown amps under the stage and the buzz of the concert. Before long he was hooked on the gig scene.

It seemed the natural thing to do; to take his expertise and move to the emerging market of Hong Kong. Along with brother David and partner Simon Fraser, they founded an equipment rental company which was subcontracted to larger AV companies catering to the corporate market, doing events for product launches; fashion shows; and some big concerts throughout Asia, including China and Vietnam.

In setting up these events John invested in an early Soundcraft board; Bose and Nexo speakers; Carver amps; a 72-channel dimmer; and Astralite trussing. He relied on dealers and hire companies, often one in the same, to supply the rest of the setup.

'One of the main problems we encountered was that having quality equipment would be enough to command a large chunk of the market. We found that companies were buying in gear and just running it into the ground--three of the 24 channels on the desk wouldn't be working or knobs would be missing--so in the end, out of frustration, we realised that we would have to commit to buying in a larger amount of the gear to provide the quality that we wanted to give our clients. However, at that time, cost was a chief concern and it was hard to sell quality.'

They discovered that buying the equipment they wanted was not always easy: often they had to bring it in direct from the manufacturers; sometimes because the products weren't sold yet in Asia, as in the case of aluminium trussing; sometimes because some of the dealers in the region operated their own event companies and were reluctant to sell to the competition.

This is a common function of how companies create a distributor network in Asia. Manufacturers appoint the agency to their biggest or first customer in that territory, yet it seems illogical to expect a company which is a user-operator to introduce a new product to his competitors. John found that introductions normally came with higher prices and longer lead times than travelling to Europe or America to buy direct.

This situation is changing as the Asian industry matures and manufacturers become wiser. The original family businesses which saw the A-V market as an opportunity are now being run by these sons who have taken a genuine interest; or by professionals who are influenced by crews and skills that come in from the West, or by an increasingly sophisticated audience; or by modern venues.

Large venues, designed with entertainment in mind, are funded by the rise and rise of the film industry and CantoPop stars such as George Lam and Anita Moy, who are popular enough to put on concerts on a scale previously reserved for only a handful of international stars like Jackson, Turner and the ubiquitous Keanu G. Events are arranged by promoters who deal predominantly with agents, rather than record labels, a situation that may change as promotional budgets; TV exposure; and distribution outlets are seen as the keys to success, as in Europe and America, rather than the relationship between the talent and the minder.

One of the implications of this is also that it is virtually impossible to arrange a regional tour because promoters tend to organise events in one, or perhaps two, markets. What the big record labels are trying to do is to create regional artists via the vehicles of Channel V and MTV Asia, and retail groups like HMV and Tower are establishing outlets in all the major cities, but as John points out part of the problem is cultural--Asia is less homogeneous than Europe in terms of common languages, religion and so on--and part is geographical.

When you look at Indonesia, for example, there are over 13,700 islands, 185 million people and one major city, Jakarta. The only way to tour in Asia is by plane, with artists who are big enough to draw the crowds. This requires that passenger and freight planes are chartered, for rigs, cables and crew--underwriting a tour can get expensive. Supplying all the things that can be sourced locally is what Technical Production and Event Management Consultant, John Rule, and his company does, taking advantage of local knowledge and contacts with an unwavering patience.

'One of the main problems for those coming out here and working with local crews is attitude. Aggressive management styles just don't work in Asia. We work as a buffer between a production company and the venues, knowing how to ask for things and who to ask; trying to not lose it when it doesn't happen. In my opinion if you haven't got patience and a sense of humour don't bother trying to work in Asia.'

The only country John Rule believes will be able to sustain a major road tour is China with 63 cities with over three million inhabitants, but for now the major venues are in Shanghai, Beijing, Guangzhou, Tianjin and Xianmen. The Chinese are keen to see Western acts; although according to reports the content of the performance is quite closely watched: exposure of flesh, profanity and anti-establishment messages are definitely not encouraged. For any young person who wants to follow in John's footsteps in a few years time they will find that there is the opportunity of a 63-date tour, over two years, up for grabs. Requirements: have patience and travel $
Leading edge performance has been a defining feature of Audio Precision products since the inception of our company in 1984. Thousands of our System One audio analyzers are in use worldwide, selected by design engineers for high performance and by test engineers for our comprehensive programmable analog and digital audio measurement capabilities.

Now our System Two true Dual Domain audio analyzer joins the System One, setting a new standard for performance and flexibility in audio frequency test & measurement.

System Two is a true Dual Domain analyzer. Other test instruments may have both analog and digital inputs and outputs but they're not true Dual Domain! They rely on performance-limiting converters to pass analog signals back and forth to a DSP core of digital-only hardware. Passing signals through a/d or d/a converters for every measurement robs the test instrument of performance. System Two Includes separate, independent hardware for direct audio measurements in both domains, plus additional and extensive interface measurement capability including jitter measurements, eye patterns and all other parameters described in AES3, the serial audio interface standard.

The new standard of System Two is represented by performance specifications such as guaranteed analog generator and analyzer residual THD+N of -108 dB, guaranteed analog signal flatness of ±0.01 dB for the generator and analyzer, and 24 bit digital signal generation with 48 bit FFT dynamic range.

From aircraft to automobiles, satellites to cell phones, headsets to hearing aids, System Two represents a new standard for audio frequency test & measurement applications. Compare for yourself - our worldwide force of representatives will be pleased to provide comprehensive specifications and a true Dual Domain on-site demonstration.

Audio Precision
PO Box 2209
Beaverton, Oregon 97075-5070
Tel: (503) 627-0832 FAX: (503) 641-8906
US Toll Free: 1-800-231-7350
Unapologetically targeting the mid-band of music tracking studios, AMS Neve has focused strategic elements of its R&D effort in an affordable and attractive digital console. ZENON SCHOEPE checks the balance.

THE LAUNCH of the Libra console at the Copenhagen AES Convention was surprising for a number of reasons. First, Libra is a music recording desk—it pretends to be nothing else—yet it comes from a company that many suspected, following the merger by former owners Siemens of AMS and Neve, would still the music recording heritage of Neve in favour of AMS' more comfortable position and stronghold in postproduction. The second reason is that Libra is the cheapest large-scale, digital, music-recording desk currently available. A look around reveals that a lot of intelligent money is being sunk into the circa-£100,000 desk area. This has become something of a new price point above which there is a lot of smart analogue and digitally controlled analogue-console activity which undercuts the truly serious money of the established 'super desks' in both analogue and digital form. At prices starting at around £120,000 for a 24-fader configuration, Libra is currently the only digital music board playing in this part of the park.

Thus we arrive at the curious observation that AMS Neve should be launching its most significant new product since the Logic 3-AudioFile pocket-rocket combo into the less affluent digital music recording sector and at the popularly stereotyped starving families and studio staff that inhabit it. Yet it makes sense, and Libra is a significant development for AMS Neve—for while the postproduction price range and the production process itself is served by the company's Logic 3, through the Logic 1, and on to the Logic 2, the music-recording desks were confined to the upper echelons with the big analogue VRS and the digital Capricorn with no lower-priced option supporting them.

According to AMS Neve MD Mark Crabtree, this observation has been a cause of some concern although he alludes to the fact that while AMS Neve would have liked to have done something about this state of play earlier it clearly couldn't. Perhaps it's significant that Libra should arrive so promptly after the divorce of AMS Neve from Siemens into private ownership. The intention is to apply the company's considerable digital expertise to the studio band of more ordinary folk, rather than the absolute top end served by the Capricorn. Crabtree's concept for Libra came about while playing around with a fictitious wish-list desk that would best suit a project studio for his sons. Having opted early on for a digital platform because he wanted full dynamic automation, he found himself drawing together parts of the AMS Neve product range. The Capricorn was too big, but he liked the Assignable Facilities Unit and its multifunction switches, he liked Logicator pots, but the Logic 3 was too small and he wanted a fader per channel. What resulted in loose control-surface terms was a best of compilation desk with a chunk of Logic 3, a chunk of Capricorn, and a lot more of everything else around it. The Libra uses Logic series components because its a more scalable engine than the Capricorn, yet employs the latter's converter technology, although Crabtree is at pains to point out that the control surface is unique to Libra.

"In the area of music, everybody would love to buy a Capricorn but it's too expensive and we can't make it cheaper so Libra was designed to bridge that gap."
conversion module that will be applicable to any of the company’s digital desks.

‘MADI is a very important word you should watch for from this company because it is the link between other Lego blocks,’ says Crabtree who, after only slight pressing, is persuaded to talk for the first time in any detail about AMS Neve’s long-awaited networking plans in which Libra can play a part. ‘What we’ve got is a thing called WorkFlow which is our cover-all term for interconnectability at AMS Neve,’ he explains. ‘That’s split into three different areas, the first is the routing of programme material from place to place from disk, which is called StarNet, where you can attach various disks, other people’s disks, for moving data around. Next along from that is MADI which is a MADI routing system where you get MADI streams in, you strip them out, reform them and get them out the other end which allows you to route different studio signals from place to place. Finally, there is the machine control aspect called SynchroNet which allows you to get at particular machines.’

**WORKFLOW** is obviously geared towards situations where a great big desk sits at the end of a filmic or video process.

‘What you’re trying to do is bring all those elements together to that final stage, and our products, the engines, and the networking, are all designed to facilitate that movement backwards and forwards along this chain,’ Crabtree says. So is Libra a part of WorkFlow? ‘Libra has Encore,’ he replies, ‘our generic automation system, which means it will be able to move to and from the other automation systems we have. If you wanted to get this desk into WorkFlow you could connect it to MADI, but as a music console it’s not really intended for the degree of interconnection.’

Part of the game plan for Libra is that it will appeal to studios that deal in passing trade and numerous engineers as AMS Neve admits that the complexity of a Capricorn or a Logic 2, in particular, lends itself to facilities that have the luxury of an in-house engineer dedicated to learning the intricacies of these more complex desks.

‘It’s targeted at people who want a music console but not the price to give them ultimate flexibility,’ continues Crabtree. ‘We didn’t want the console getting in the way of the creative process. If you take a Logic—and people are using them very successfully for music—the flexibility of it, and it’s ability to be split or in-line with routing from here to there is wonderful.’
There's enormous danger with this routeing, we've tried to make one short set of rules cover a wide area.'

EXPLAINING the particular details of Libra is not the purpose of this article but giving the gist of what is on offer is. In popular fashion it has a separate control surface and remote processing and interface racks with these racks interconnected via MADI. The desk is essentially in-line in presentation with each strip carrying a record and monitor path each of which can have access to full EQ and dynamics. There's also an additional secondary input which can be used for extra returns which triples a 24-fader configuration to handle 72 inputs. The Capricorn style AFU provides the knob and switch per function control albeit through the use of Logicators, while multitrack buses are handled in groups of 16, any channel can be mono or stereo, and there's surround-sound busing and monitoring. You get two screens, one of which is dedicated to displaying signal-flow parameters and multitrack track-arming, the other dedicated to Encore. EQ curves and dynamics parameters can be shown on screen and a path-configuration page for ordering the processing is available in a manner similar to that on the Capricorn. EQ is the Logic's, 4-band, fully parametric arrangement.

They've succeeded in doing away with hidden functions, there are no shift routines, and everything is on the surface simply one key push away.

Channel strips contain a small number of dedicated controls plus a lot of indicators to tell you the status of the selected path being looked at; plus signal present LEDs and dynamics indication. There are two Logicators per strip the bottom one being always the pan, the top one...
Grab a mic. Grab a Sony.

How do Sony wireless systems measure up? Our users say: 'Sounds better.' 'Easier to use.' 'More reliable.'

And they’re less expensive, too!

Whether it's theatre sound, ENG, live stage vocals or TV studio,

Sony wireless is the answer.

From single mics to large-scale multi-channel systems, the state-of-the-art WL-800 series offers the highest audio and RF quality. What's more, our multi-channel systems offer the greatest number of channels without any compromise of quality.

The fact is, our wireless mics have the same great feel and sound as wired mics.

And with Sony advanced circuit technology and maintenance-free design, these mics have stunning reliability.

So listen.

Sony wireless mics are for movers and shakers. Everywhere.
In honesty, the real benefits of digital mixing and the sort of facilities offered by the high-end products have been of only passing academic interest to the core of studios which have been forced to stand and watch progress pass them by.

assignable for whatever you want by pressing an ASSIGN button and touching whichever control in the AFU you want to display across the board. The Capricorn's aux flip trick for assigning aux feeds to the faders is maintained as is the ability to rearrange inputs to faders for convenience and there are 16 mono or stereo auxes; eight mono or stereo groups, and four mono or stereo outputs which can be patched out to four different destinations. The monitor and master section is busy but then it's a grown-up desk panel. It's all very analogue in presentation and logic. AMS Neve is a discernably more relaxed and open company since its very recent departure from the Siemens fold. You get the impression that somebody finally got around to emptying the car boot of concrete and adjusting the hand brake so it doesn't drag.

I'm impressed at how much sense Libra makes even after a cursory encounter. While distinctly compact it is not so diminutive as to look ridiculous in any decent-sized room. It looks the part, it looks serious, and I believe it is.

Libra will appeal to a lot of people purely on price. In honesty, the real benefits of digital mixing and the sort of facilities offered by the high-end products have been of only passing academic interest to the core of studios which have been forced to stand and watch progress pass them by. On its way to the truly rich or the postpro community, Libra is applicable to these studios and they'll actually be able to sit down with it and open their hearts to what really is a stunningly clear presentation with enormous levels of control and convenience in the knowledge that they may just be able to afford it. Questions about digital multitrack upgrades and the alternative of DCA desks persist, but that's down to the business plans and choice.

It's a contentious point, but I believe that Libra will force the hand of other console manufacturers to respond at this price point much in the same way that the Yamaha 02R did further down market. It's good news for recording studios everywhere that have been hamstrung by the sort of investment previously required to take a digital leap.

Libra has the aura of established technology about it. AMS Neve has reapplied existing and proven technology that does not require the leather crash hat, flying goggles and pioneering yet forgiving spirit associated with early digital desks and I would have to include the early days of the Capricorn in this category. AMS Neve seems to be on top of this stuff now, it's a repackaging and redirecting exercise more than some introduction of revolutionary concepts and technology. It will be extremely interesting to see precisely how Libra is received and how many cheque books talk.

**CONTACTS**

AMS NEVE, Billington Road, Burnley, Lancs BB11 1UB, UK.
Tel: +44 1254 457011.
Fax: +44 1254 395442.
WWW: http://www.ams-neve.com
Independent testing of seven leading DAT tape brands* proves HHB DAT Tape is already the clear leader, with consistently lower block error rates and superior archival stability.

**Now we've made it even better:**

- Increased tape lengths at no extra cost. The new HHB DAT125 is the longest professional audio DAT tape available.
- Improved heat resistant shell will not warp, even after 2 hours at 107 degrees C.
- Improved anti-static lid discharges static twice as quickly, reducing dust contamination.

- Improved base film enables the tape to mold better to the head, reducing surface resistance and head wear.
- Improved formulation of the magnetic recording layer increases resolution, lowers block error rates and extends the secure archival period to 30 years.
- Improved J card and a new shatterproof, reusable Polypropylene case.
- Shrink wrapping is replaced by a new, eco-friendly ‘freshness seal’.

**HBB professional DAT tape.**

Would you seriously consider using anything else?

Contact your nearest HBB Advanced Media Products dealer today.

* Studio Sound ‘DAT On Trial’. Call HHB Communications for a free copy.
Good News Travels Fast. And Far.

The Calrec S series broadcast console, launched at the 1995 IBC, is already installed and working in studios worldwide, including ABC Australia, MBC Korea and in the U.K. the BBC, Anglia, Yorkshire, Tyne Tees and Fountain TV facilities.

Its compact frame and considered ergonomics, its 72 channel capability, 8 groups and 32 tracks make it ideal for dubbing studios and mobiles too. Creative Technology, Visions and Black & White Mobiles have all installed S Series in their superb trucks.

In 1996 the S Series will be used for the Olympics in Atlanta, specified by North East Productions of the USA for NBC and by the BBC for National and World Service TV coverage. This nail biting test of capability and reliability clearly demonstrates the confidence that the broadcast industry has for Calrec.

The Calrec S Series. Obviously good news for studios who need first order audio in a compact frame and want it now.

Calrec Audio Ltd. Nutclough Mill, Hebden Bridge, West Yorkshire, HX7 8EZ. UK. Tel: +44 (0)1422 842159. Fax: +44 (0)1422 845244
Amek DIGITAL MIXING SYSTEM

The rush is now on to secure a share of the middle of the digital mixing console market. ZENON SCHOEPE assesses Amek’s dynamically-based Digital Mixing System and its relevance to all areas of pro-audio operation.

IF YOU’VE SEEN Amek’s Digital Mixing System—or DMS console—evolving while doing the rounds at exhibitions, two things will have been apparent to you. Firstly, you will have spotted a work surface that looks almost ‘retro’ by digital desk standards, and secondly, you will have picked up on the claim that it is among the most expandable and variable in the configuration of its controller surface and processing power.

While what the DMS does is not necessarily that different from what any other manufacturer’s digital desk does, Amek’s people claim that the way they have met the design challenge is the development of a DSP engine wasn’t targeted specifically at digital mixing, and Amek makes it clear that it was out for horsepower that could be applied as desired rather than an application-specific device—and a digital desk was a natural progression for a mixing-console manufacturer. It should be said, however, that nobody will actually explain what other purposes Amek might have in mind for the engine.

What is clear is that Amek wants the appeal of the desk to be as broad as possible. To this end, the exhibition version has looked particularly well suited to broadcast, the first DMS was bought by postproduction facility (Hullabaloo in Manchester) while the control surface of the DMS has been employed by Fairlight as a front end for the mixing functions of its MFX3 DAW in its FAME—of which more than 35 have so far been sold. Options are still being kept open, and for good reason according to Amek Technical Director and cofounder Graham Langley. “We’ve always found with our analogue products that until people start using them you don’t know what market will take to them—a product can fall in a completely unexpected area,” he explains. “We tend, with a digital console, to think it can go anywhere and your control surface almost defines the application. It gives us a bigger market potentially.”

THE SYSTEM consists of four elements: the control surface with host Pentium computer, the 32-bit floating-point DSP engine, I/O racks and an automated crosspoint matrix. These are configured to provide the advantages of virtual and hardware solutions as the mixer can be reconfigured on a task-by-task basis to suit an application within the constraints of the available signal processing and the number of I-Os. Dynamic Resource Allocation is part of this principle and will eventually extend to shared configurations in which the DSP may be divided between two or more control surfaces.

Dynamic Resource Allocation is part of this principle and will eventually extend to shared configurations in which the DSP may be divided between two or more control surfaces.

Amek’s digital initiative—designed to meet the requirements of a changing market.
"We didn't spend weeks designing I-O systems and interface chips because it was inevitable that these would be available off the shelf."

-Graham Langley

The policy of getting as much out of what is there and keeping options open, with the biggest decision made at the purchasing stage when I-O and DSP is actually specified, according to Langley, modularity is the key: 'The point is that you can start off with a very minimal system, you can buy more processing and I-O racks. Having started with a little assignable panel which may be controlling, say, eight channels, the control surface can be expanded to give you more hardware channels, or you can add more processing power and use the same control surface to control 24 channels; you can go in every direction.' Familiar concepts like input and output channels are retained. Inputs can be mono, stereo, LCRS or LCRSSB sets, may have mic or line inputs, or be dedicated to multitrack returns.

Mono, stereo, LCRS-LCRSSB group and/or main output modules can also be specified. DSP power can be increased by adding more cards and Amek is at pains to point out that no ASICs or other custom componend have been used.

Automation is based on the Superflove moving fader system and combines full dynamic automation with snapshots and on and off-line editing with graphic displays and libraries of popular settings. In traditional Amek fashion, the price of the desk on a like-for-like comparison with competing products lands it in the middle ground in a similar manner to Amek's analogue consoles.

According to Langley, the origins of the desk extend beyond the five or so years that have gone in to the R&D on the engine. 'We knew that eventually the market would go to assignable and digital consoles and we developed a face plate control surface layout probably ten years ago — certainly before the APC 1000 [Amek's first digitally controlled analogue desk] — which we put to 'some' people,' he says.

A continuous process of redesigning the face plate has resulted in what Langley claims, is now a desk that people feel comfortable sitting behind but still employs the original concept of modules that can be added or subtracted, depending on how people prefer to work. This concept was introduced 'long before most of the stuff was technically possible'.

'It was a concept then, and we made no attempt to build a console,' Langley explains. 'Although we took on DSP engineers at the time and developed various bits and pieces and algorithms the main thrust was on the DSP engine and seeing what was happening with other people and the problems they were hitting. We didn't spend weeks designing I-O systems and interface chips because it was inevitable that these would be available off the shelf so we'd be wasting our time duplicating other people's efforts when they'd more than likely be better than something we could come up with ourselves.' The whole architecture is hardware independent so we can develop new boards for the engine if the individual chips are upgraded by the manufacturers. Similarly if a significantly different device comes out we can change the processor boards in the engine and move in that way.'

Langley adds that Amek doesn't have the purchasing power of Yamaha to create custom chips and has opted instead for AT&T DSP chips. 'We have some interesting ideas that nobody else has done yet because it forms a new platform for us to continue development on, particularly in developing application specific software in the same way we derived ShowTime automation for live and theatres from SuperTrue,' he continues. 'As the desk this concept finds new markets, new software will be developed. Potentially there could also be variants on the control surface. However, we're not about to make the digital equivalent of a 9098 which would be pointless anyway. We still maintain that the audio quality of something like a 9098 is dramatically superior to anything anybody can produce digitally,' he states. 'It's another reason why we've taken off-the-shelf technology because ADCs will get better and we can put those in as, and when, they get there. For the markets we're aiming at, this is as good as digital gets.'

AMEK CHAIRMAN Nick Franks agrees that the quality of digital even at its finest can still not challenge the best of analogue. 'Analogue is superior — monstrously superior,' he says. 'Our perception was that broadcasters have all of their sources in digital and they don't want to go out of digital and then back again just for the sake of mixing it. Most of them are working with a relatively limited bandwidth for broadcast anyway so they're perhaps less concerned about the finer points of audio quality that recording people are interested in. The getting pictures on the air and sound is just something that you have to have.'

'There's also this area where there's a lot more signal traffic in broadcast production and these signals are better being shuffled around in digital form and it avoids problems. So it's logical for broadcasters to want to be in digital,' asserts Franks. He adds that while the DMS at one stage looked as if it would find a niche as a digital replacement for the BC3, as things developed Amek realised it could do a lot more. 'There is substantial money in all these markets because what we all know is that television hours are growing, record production is a different thing.'

Franks won't rule out any potential market application for the DMS but admits to reservations about a push into recording. 'Making a recording version is in my view no radical change,' he explains. 'Calculation of algorithms is calculation of algorithms, a computer. It puts out something that looks like a recording console then that's what it's doing. If you look at the studio business overall it's not very buoyant worldwide — this is not 1985. There are a number of digital desks for recording studios and none of them are selling particularly substantial numbers. It's something that I guess we'll do but it's interesting in terms of technology but not in terms of financial reward. Perhaps some of the other companies are making a lot of money out of selling digital desks to studios but I don't think so.'

Surprisingly, Franks admits to not having looked at the products of his competitors. 'I make a great point of ignoring them all. It doesn't interest me,' he says. 'I beg the question of whether he might be missing something. 'Yes you're right,' he replies. 'I might be missing something.'

CONTACT

AMEK SYSTEMS & CONTROLS, New Islington Mill, Regent Trading Estate, Oldfield Road, Saltfield M5 4SL. Tel: +44 161 834 6747. Fax: +44 161 834 0593. US: Tel: +1 818 508 9786.
Good to know the **music** will sound just as **great** ten years after!

To make sure everything plays as perfectly tomorrow as it does today, professionals choose a classic tape for **mastering** and **archiving**. With Studio Master 911 by BASF, you’ll improve on dynamic range. Edge tracks are **fully functional**. There’s **additional protection** against shedding and sticking. And, extremely high archivability that’s been proven time and again. So the music still **sounds great** even ten years after.

For information, call UK: Tel. 0181-908 8340, Fax 0181-904 6052; Int’l Mktg, Germany: Tel. 0621-5920 366, Fax 0621-5920 299
ONE MAN, FOUR BAND

Normally, the only way to get high quality inputs equipped with full 4-band parametric EQ is as part of a big, expensive console.

Now, uniquely, the compact FCS-916 gives you sophisticated control of a single input with clear, easy-to-use controls and bright indicators. Engineers, musicians and songwriters get all the creativity they've ever wanted – right at their fingertips.

Now one man can have four bands.

FCS-916
PARAMETRIC EQUALISER
PRE-AMPLIFIER

1U Rack Height
Mic/Line Input
Sweep High Pass Filter
Sweep Low Pass Filter
4 x Parametric EQ Controls with Notch Mode
Overall Gain Control ±15dB
Bypass Switches on all filters
Having gained respect at the high end of the mic market, Audio-Technica have produced a ‘set’ of more affordable microphones. **Dave Foister** throws the lot at a session—and comes out smiling.

**Audio-Technica’s** microphones have made something of a splash in recent years, with the 4033 and 4050 making a deserved impact on the large-diaphragm, studio-condenser market. Now there is a new budget range of microphones, the Artist series, with the broad aim of covering both live and recording use. The range comprises three electret condenser models and a dynamic, all built to withstand stage use and with studio aspirations.

The condensers offer two cardioids and an omnii, all powered either by phantom or an internal AA battery. This gives away the electret nature of the design, although the implementation is slightly unorthodox in that the permanent charge is on the fixed back plate, making it possible to use a much thinner diaphragm to improve frequency response and transient behaviour. The specs also make it clear that the performance with phantom power is substantially better than with the battery alone, with 14dB more headroom and consequent increase in dynamic range, lower impedance and slightly improved sensitivity. Nonetheless the battery option is bound to be useful in many applications.

The two cardioids appear to be electrically identical, the differences being in the acoustic design. The ATM33a is a straightforward stick microphone, while the ATM31a has a substantial windscreen for vocal use; the head design also appears to make the cardioid pattern a bit more regular with frequency according to the published charts, although the 33 is still commendably consistent. The other condenser is the ATM10a, a simple and elegant omni design clearly built around the same preamp body, although this is not a modular system and none of the heads can be removed for swapping around. The microphones are as simple as it is possible to be, with no adjustable controls whatever; pads are claimed to be unnecessary and bass roll-off must be applied at the desk. All come with the same standmount, a rugged affair with a metal base which accepts the supplied thread adaptor for ½-inch stands, although for the larger cardioids both clips had to be tightened up to support the weight without drooping.

The ATM25 is the dynamic member of the family, and resembles a short, squat EV RE20. Its polar pattern is specified as hypercardioid, and although its frequency response is inevitably limited compared with the condensers it still claims to reach 15kHz, albeit at about 5dB down.

Its maximum SPL is not given, but it appears to be pretty much bomb proof in every sense. Its stand attachment is integral to the body and features a lockable knob to deal with its not insignificant weight. It too has no switches at all.

**I took the plunge** and recorded a live jazz session almost exclusively with the Audio-Technica microphones: spaced ATM10a overs for the kit, an ATM33a on the snare and the ATM25 on bass drum, with a 33 on tenor sax and a 31 on soprano. Upright bass was handled by a DI in combination with an ATM31a.

The results were spectacularly satisfying. Audio-Technica’s claims for the microphones’ ability to withstand high SPLs without distortion were unquestionably borne out in practice, despite the absence of pads. The omnis produced a clean open sound with surprising depth and an apparently well-matched stereo image, with no hint of distortion; pads were needed on the desk, but the output was not so hot as to risk giving trouble with a decent mic amp.

The two cardioid models gave a virtually identical direct sound, again with a good bass extension (everything I needed for the double bass) and a natural unstrained top end even half way down a saxophone bell. Remarkably almost, there was a distinct difference in the sound of the spill. The larger ATM31a sounded appreciably less coloured off-axis as would be suggested by the published polar plots, the 33’s broad back lobe at 8kHz showing as a brightness in the ambient pickup. This would suggest that despite its apparently more specialised design, the ATM31a makes a better general-purpose microphone than the 33 unless bottom-end spill is a particular problem: for single overdubs where spill is not a problem at all then there is virtually nothing to choose between them.

The ATM25 dynamic certainly looks the part, and reassuringly it sounds the part too. It has the requisite ability to deal with the blasts and shocks of a close bass drum, with enough upper extension to make it useful for much more besides. Its unusually small size suggests several uses where some familiar big dynamics would be cumbersome, and its smooth extended sound gives it a condenser-like quality with all the mechanical advantages of the dynamic.

A nice touch is the availability of a canvas carrying case containing a block of chunky foam with cut-outs for eight microphones (curiously known as the 6 Pack), which can accommodate all the Artist Series in their soft pouches. This whole range is a very impressive addition to Audio-Technica’s microphone armoury, with a sturdy enough construction to inspire confidence on stage and a performance worthy of the studio—among the most versatile workhorses you will find.
INTRODUCING QUANTEGY.
THE NEW COMPANY THAT'S BEEN MAKING AMPEX TAPE FOR OVER 35 YEARS.

Nothing's changed, really.
You still get the audio mastering tapes that go gold more than all other brands combined.
The same top quality video tapes used by broadcast and creative professionals around the world.
The same market-leading instrumentation tapes used by aerospace and government.

And the same manufacturing, technical support and sales people.
You even get the same Ampex® brand name.
The difference is that we're now the only media company dedicated exclusively to you, the recording professional.

So call us today and we'll tell you more about Quantege.

After 35 years, we're just getting started.
MTA INTERMIX

Trading flexibility for modularity, Console Designer Malcolm Toft has sought to defeat the compromises imposed by real-world console budgets. TERRY NELSON investigates the modular alternative

FLEXIBILITY, IN PRINCIPLE, is great. After all, why choose to limit the potential applications of your next major purchase? Flexibility—in practice—can present problems. How certain are you that you'll end up with something that does what you want, rather than everything but?

Surprisingly enough, consoles tend to fall into the 'flexible' category and this is easily explained by the fact that many are hybrid in design, intended to address a variety of applications but fail to squarely cover any one. This also explains why studios are applications obsessed. This also explains why studios are applications obsessed. From the comfort of their home, they question what they need and whether there was anything on the market similar to a component hi-fi that would allow "custom" systems to be built up and existing ones upgraded—all at an economical price. My conclusion was "no, there is not" and I started working on Intermix.

The system is based around 16-channel rack modules, which allows for a simple system at the start and room for later expansion as required. You could start, for example, with 16 mic-line inputs going to 16 groups and end up with a 64-channel console with 32-track monitoring and EQ on all channels and monitors.

However, I was very concerned that while the price structure was to be very reasonable, that the equipment be of the same quality as our MTA consoles. For this reason, virtually all circuitry comes from the large consoles and the same components are used.

AT PRESENT, the Intermix range consists of six rack modules plus rackmount power supply. The 16-channel mic-line rack (2U-high) features a rotary gain control, plus -20dB, phase reverse and 48V phantom switches for each channel. The rear connections include a Neutrik combined XLR-balanced jack for each channel in order to provide separate mic and line inputs, and balanced 'n'-inch output jacks. There are also multipin Interlink connectors which will come back to later.

The EQ rack (4U-high) features 16 channels of the MTA, 4-band, swept equalisation and includes an EQ input switch, input and output connections are balanced 'n'-inch jacks and Interlink connectors. The 16-channel routing and panning rack (4U-high) features 16-track routing...
The EQ module: 16 channels of 4-band swept EQ provides full monitor and group send facilities for 16-track recording. Each channel includes monitor level and pan controls, Tape switch for group or tape monitor, AFL and Mute switches and linear-group fader. Another useful feature is a FADER REVERSE switch for applications such as live mixing with multitrack recording. Apart from the ubiquitous Interlink connectors, connections are via balanced ¼-inch jacks with separate inputs designated Group Insert Returns (input) and Tape Returns plus Group outputs.

The Master Control Unit (3U-high) is where everything comes together in a tidy package and this also provides some dedicated facilities. Looking at the front panel from left to right, there are eight level controls for the Aux Masters complete with SOLO switches, six auxiliary returns with level and pan controls plus MUTE Switches, a talkback section with in-built microphone and level control and routing switches to send talkback into Aux 7/8, groups or studios. This is followed by a Studio Playback level control with an on switch and routing switches to send the signal into Auxes 5/6 and 7/8. Solo Master level control with Solo Enabled LED and Monitor Master level control with 4 source select switches, viz: 2 Track 1, 2, 3 and Mix plus Mono and Mute switches. The right of the panel is completed with two 12-segment LED meters for the Master Outputs and Solo and a linear stereo Master Fader. All connections are via balanced ¼-inch jacks with the exception of XLR-3M connections for the monitor, mix, studio-playout outputs—and, of course, Interlink connectors.

The MODULAR APPROACH applied to Intermix is self-evident. However, a little delving into the system brings out its versatility—at the centre of which is the Interlink feature. Whereas connection of the different racks is simple enough, the key to the system is the Interlink balanced, ribbon-cable, interconnection facility. Interlink offers the flexibility of easy patching for comprehensive system for example the Monitor-Tape Return module features Interlink connectors for meter feeds, EQ in-out (in order to place EQ on monitors), aux pre-post sends and Interlink buses (including solo, PLF and AFL busses). In fact, a whole system could be built up using only ribbon cables—the only exceptions being the preamp rack inputs and the tape return inputs on the right of the panel where the Intermix connectors are provided.
The mic-line module features phase reverse and individual 48V phantom power

As well as building your own custom console, you can incorporate elements of Intermix into your existing system in order to expand operational facilities for a moderate cost—you could patch in an aux-send rack into the insert points of your console (pre and post fader) and immediately gain another eight aux sends.

The mic-line rack and EQ rack are fairly obvious choices but a host of other possibilities are lurking. You could, for example, take the direct outs of your console into the routing rack and give yourself 16-track routeing facilities. The monitor-tape return provides 2 x 16 (or A-B) line inputs mixing down to stereo via the Master rack—as well as 16 group outs. The tape switch simply becomes an A-B source selector for a total of 32 line inputs. As with all systems of this kind, the more you get into it, the more uses you can find—it just depends on how flexible you want to be.

AFTER A RUN-THROUGH with the system in the MTA workshop, I must admit that I was convinced of the validity of Toft’s design approach—with terms such as ‘OB vans’, ‘small permanent installations (in terms of physical space)’, ‘system expansion’ lighting up in front of me like so many neon signs. Where I feel MTA has scored heavily is by providing high-class console circuitry and features in equipment that is economically priced (prices range approximately between UK£3600—£9000 per unit). There is a lot of ‘budget gear’ out there in the audio marketplace which offers a stop-gap solutions but MTA seems to have found a niche with a system that will be equally at home in a broadcast or A-V studio as well as sound reinforcement installations and home studios.

Malcolm Toft: ‘The aim with Intermix was to provide the same quality in terms of sound and construction as that found in our studio consoles but at a price that would allow people on limited budgets to either purchase basic systems for future expansion or upgrade existing equipment.’ Personally, I think Toft aim has more than been achieved. And the game is not over as a 16-channel compressor-limiter rack and gate-expander rack are soon to emerge from the Intermix stable.

The Chief Engineer demands an excellent long term investment—and it satisfies the needs of both!

Operational Benefits include:
- Reliable and proven proprietary hardware and software
- Up to 22% more and local assignable sources/destinations
- Easy to operate digital mixing and total automation
- Integrated MTR offering unique “free play” cartridge style playback
- Integrated VisionTrack™ random access video option
- Audio Preparation Station (APS) efficient project management and offline editing option
- Fast and easy background file back up—gives peace of mind

MTA, The Old Farmhouse, 27 Ash Hill Road, Ash, Hampshire GU12 6AD.
Tel: +44 1252 318700.
Fax: +44 1252 345546.
US: David Michaels Associates, 5090 Don Pio Drive, Woodland Hills, CA 91364. Tel: +1 818 888 2440.
Fax: +1 818 884 0976.
Tel: +81 03 3583 0451.
Fax: +81 03 3589 0272.

Solid State Logic
Broadcast & Post Production
Begbroke, Oxford, OX5 1RU, England

S: Se, if you are an Operator who is keen to know more about the new digital age or a Chief Engineer who is looking for a future safe system call now for more data.

0 1 8 6 5 8 4 2 3 0 0
Aphex MODEL 109

Given the current proliferation of EQ units, old attitudes to multiple reverb may soon be extended to include equalisers. **WADE McGregor** test drives a cost-effective addition to the catalogue – the 109

**APHEX HAS DEVELOPED** a reputation for building high-quality audio units for dynamic control and enhancement of audio signals—including the Aural Exciter and anthropomorphic-sounding Big Bottom. The original processors were priced to suit the serious studio, broadcast and live-sound professional. A few years ago Aphex introduced the Model 100 series of processors suited to the budget of the project studio and local sound-reinforcement rigs. This new series sports a simplified front panel to allow even the casual user to quickly get results. The most recent additions to the series also include Aphex’s patented Tubessence valve circuitry.

The Aphex Model 109 is the first equaliser in the 100 series (Aphex also builds the 9901A in their modular 9000 series) and offers four bands of fully parametric control that can be switched to operate as a 2-band, 2-channel unit. Each pair of filters cover the audio band with Band 1 ranging between 20Hz–2kHz while Band 2 covers the 200Hz–2kHz range. This provides plenty of overlap through the voice range and does away with the usual range switch. The Bandwidth for each band is adjustable from two octaves (0–66) to two-tenths of an octave (0–72) with the third-octave setting at roughly the 3-clock position. All of the bands can be switched between peak (see Fig.1) and shelf filters (see Fig.2) and all bands share a single bypass switch. The Bandwidth control is disabled when the filters are switched to shelf and provide a fixed slope. In 2-channel mode there are two front-panel controls for varying the input level by ±10dB and in single-channel mode the level and input for channel two are disabled.

The unit includes the same Tubessence circuitry as many other Aphex units (including the Model 661 reviewed in *Studio Sound*, March 1996) and can simply be used for this subtle enhancement by setting the EQ level controls to the zero detent. Tubessence is a Reflectected Plate Amplifier valve implementation that promises low noise, wide bandwidth and extended life from the single 12AT7 while still offering second-harmonic distortion products (calibrated to 0.12% at +10dB) and compression effects. This is handy for driving a DAT machine during mixdown or as an insert into specific channels. It may be almost irresistible to add just a little equalisation while you are at it, though.

**THE MODEL 109** is a versatile tool that suits both the musician shaping the tone of an instrument or overall mix and audio surgeon who must remove blemishes in the sound. The high-Q settings provide a sharp knife where you need to cut away annoying whistles, whines or buzzes without chopping out to many notes in the affected area. It is possible to achieve over 60dB notches by stacking the filters (see Fig.3).

All of the front-panel controls have numeric labels at the centre and extremes of the control range, the remainder of the range has simple tick marks. You must use your ears or measurement gear to tune the unit in to a particular setting. The user manual includes diagrams of the controls with a few more numeric legends and a listing of settings for many typical instrument sounds as a starting point for those unfamiliar with this format of EQ.

The Model 109 uses an external wall-watt-style power supply that decreases the cost of the unit and simplifies meeting the requirements of the various electrical standards around the world. These ubiquitous devices are a little problematic to install in portable racks but most of us have already found a way to make them stay firmly connected, such as providing a short extension and tying the unit to the base of the rack.

The rear panel sports 6.3mm minijacks for input and output connection of each channel with the inputs fully servo-balanced and the outputs ground-referenced (Aphex terms this single-ended impedance balanced) to provide some common-mode rejection improvements over typical single-ended connections. However, unlike balanced outputs, ground-referenced outputs will not pass audio if the polarity reversed while connecting to a single-ended input. A pair of rear-panel switches select between operating levels of -10dBV or +4dBu for each channel.

Each frequency control covers a 1:100 range but I didn’t find it too difficult to tune the filters accurately when setting precise loudspeaker equalisation using a TEF analyser. You might want a few more filter bands and higher Q values to equalise sound reinforcement systems but four bands were enough to tweak in the critical mid-band for one channel on a good set of studio monitors. Accurate parametric equalisation can also improve the phase response of the system if you stick to equalising the equalisable. In production situations the Model 109 can nail down a few hot notes and smoothly roll-off rough edges on instruments. The 109 can also provide a handy tool for touching up stereo programmes or fixing a troubled track and can add some subtle valve qualities in the process at a price that allows it to be dedicated to any of these tasks.

![Fig.1: Aphex Model 109 filters at 1kHz and ±15dB with bandwidth at maximum and minimum](image1)

![Fig.2: Band 1 (low) and Band 2 (high) set to shelf at ±15dB at 1kHz](image2)

![Fig.3: Aphex Model 109 with all four filters set to -15dB at 1kHz and minimum bandwidth](image3)
M-O-D-U-L-A-R-I-T-Y
D827 MCH - customize your recorder for highest quality DASH recording
Fostex PD4 PORTABLE DAT RECORDER

DAT is now widely accepted as a professional, portable, recording format and has seen a variety of approaches to location-recorder design. Dave Foister examines Fostex's latest response to the challenge.

**WHILE OTHERS** make things smaller, Fostex makes them bigger. When others' DAT machines began to look more and more like domestic cassette decks, Fostex DATs just got chunkier, with the kind of controls and displays that leave no doubt you are looking at a professional machine. A Fostex master recorder looks like a master recorder, which is more than can be said for some.

And the same applies to portable machines, the subject of even more diverse approaches. The balance between portability and operational access—big buttons on a small machine—is a challenge which has inspired a variety of responses, all of which Fostex appears to have ignored. It must have crossed the designers' minds that the advantages of DAT over open reel are running times; quality; convenience; and flexible synchronisation, not necessarily physical size; as long as the machine is no larger or heavier than its analogue counterpart it has enough benefits to win the contest without being squeezed into a matchbox.

Hence the PD-4, successor to the PD-2. The machine is easily twice the size of some of the competition, but still smaller than a Nagra IV and substantially lighter. It has a well-balanced, comprehensive set of facilities, none of which needs tweezers to adjust it; a commendable clarity in its layout; and some useful and distinctive features which set it apart on its own.

**THE IMMEDIATELY OBVIOUS**

one is the number of inputs: the PD-4 incorporates a fairly elaborate 3-channel stereo mixer, removing the need for a separate mixer slung over the shoulder in many situations. Each channel has independently switchable mic-line, phantom and pads, and a fully variable high-pass filter. This is all on the top, and the front panel then carries a 3-position pan switch (LCR) and a rotary fader for each channel, followed by a rotary master control with a switchable limiter. This makes up most of what you'd find on a small location mixer, and the inclusion of a monitor speaker as well as headphone jacks makes the machine pretty self-contained, although I would have appreciated a louder headphone output. All these facilities may sound like a drain on precious battery life, but switching any input to Line turns the mic amp circuitry off completely.

Time code is now a standard requirement for most location work, and yet there are still few portable DATs capable of handling it. Fostex, of course, pioneered time-coded DAT, so the PD-4 has got everything necessary for the job, including automatic time-and-date stamping both in the subcode pack and the time-code user-bits, with user override of the user-bits if required. Fostex make a feature of the onboard generator's ability to jam to a squirt of external code and then run with crystal accuracy, maintaining sync with other equipment without having to be physically connected to it (which assumes, of course, that the main time code source is similarly precise). The generator can also be set manually, and is independent of a battery-backed 24-hour clock which can be used to produce time-of-day code. Several operating modes are provided, with many software-settable functions such as whether or not code is output in pause, whether the playback frame-rate stays as recorded or follows the switch settings and so on. The large display allows all these functions and time formats to be viewed along with transport and I-O status and errors, but surprisingly omits a margin or headroom field, a shortcoming made worse by the fact that the large level meters will only hold peaks for half a second. On the other hand, the machine can be made to sound an audible alarm in the headphones to warn of amplifier clipping (but not digital overs), high errors or low-battery voltage. Coupled with the fact that the PD-4 is a 4-head machine with switchable confidence monitoring, this means most problems should become apparent without the need to look at the display.

The control layout follows location tradition by providing fast access to the most important routine functions on huge buttons under the fingers. It is interesting to note that the Pause and Record controls are joined here by a similarly large button for adding Start IDs, acknowledging the value of these and the need to be able to stick one on in a hurry without fiddling about. The rest of the transport controls are on the top panel, with ridges to aid touch identification, and the whole lot can be locked out for safety.

Power is provided by an NP-1B NiCd battery giving about 2½ hours or an external 12V supply, which is on the standard 4-pin XLR allowing connection to any video power supply. All other connectors (apart from headphones) are on XLRs, covering ins and outs for analogue, digital (AES-EBU or IEC switchable) and time code.

The PD-4 is, clearly, serious stuff for serious users. Margin indication and more headphone volume would complete the job for me, but even without them this is just about the most comprehensive, reassuringly solid portable DAT machine you will find.

**Sometimes bigger is better—an increase in size and facilities characterise the PD4**

---

**CONTACTS**

**Fostex Corporation**, 3-2-35 Musashino, Akishima, Tokyo, Japan 196. Tel: +81 425 45 611. **UK**: SCV. Tel: +44 171 923 1892. **US**: Fostex Corporation. Tel: +1 310 921 1112.
Intelligent, beautiful, complete with *Image Recall...
It was a match made in Heaven.
Finally, he'd found the console of his dreams.

STATUS • Capture all console input module settings with the touch of a button.

STATUS • User-defined master status switching for instant changes of routing setups.

STATUS • Digitally controlled dual input architecture for music and post-production.

 STATUS comes with *IMAGE RECALL, *SNAPSHOTS, *A SOPHISTICATED 4-BAND EQ, *VCA AUTOMATION, *USER PRESETS and *PROGRAMMABLE SOFT KEYS.

Get it with DYNAMICS, MOVING FADERS, STEREO MODULES! Call your Otari dealer about the smarter desk! Or write to Otari Europe in Germany, D-40670 Meerbusch, Rudolf-Diesel-Str. 12.

Luv Mixin and STATUS star in
STUDIO LOVE AFFAIR

www.americanradiohistory.com
SO WHAT COULD YOU DO WITH A MARANTZ RECORDABLE CD?

A FEW SUGGESTIONS

- RECORDING ENGINEER
  - Master a CD ready for pressing
- LIVE-SOUND ENGINEER
  - Record a band’s live performance
- RECORDING ARTIST
  - Record high quality demos to CD
- COMPUTER USER
  - Archive and back-up MDR sessions
- MULTIMEDIA AUTHOR
  - Create multimedia CD titles
- DJ
  - Create CD’s of favourite mixes

IN 1991, MARANTZ LAUNCHED PROFESSIONAL CD-R AND NOW, WITH THE INTRODUCTION OF THE CDR-620, A NEW PROFESSIONAL STANDARD HAS BEEN SET. EVERY FACILITY YOU REQUIRE IS PRESENT IN THIS RUGGED 19" RACK MOUNTABLE UNIT.

FOR AUDIO CD RECORDING, A FULL COMPLEMENT OF BALANCED ANALOGUE, AES/EBU & COAXIAL DIGITAL INPUTS AND OUTPUTS ARE PROVIDED.

FOR USE WITH MACINTOSH™ & IBM-PC™ COMPATIBLE COMPUTERS, THE IN-BUILT SCSI-II INTERFACE PROVIDES HIGH-SPEED COPYING AND PRODUCTION OF PHOTO CD, VIDEO CD, CD-I, CDI/DV AND ALL MAJOR CD-ROM FORMATS, ALL CONFORMING TO ORANGE BOOK STANDARD.

WHETHER YOU’RE A RECORDING ENGINEER, DJ, LIVE-SOUND ENGINEER, MULTIMEDIA AUTHOR, OR COMPUTER USER, THE MARANTZ CDR-620 OFFERS IT ALL. JUST THINK WHAT YOU COULD DO WITH IT.

Record CD ROM (XA), Photo-CD, CDI, Video-CD and CD-DA formats.

Use 2 CDR-620 units to high-speed copy any CD via in-built SCSI II interface.

Variable 1MB digital delay plus programmable fade-in/out.

Wired remote control with large visual display provides index & ISRC code recording and cataloguing numbering. Included as standard.

Auto track numbering from DAT S-ID’s and auto track increments from DAT, CD & DCC.

Balanced analogue XLR I/O’s plus AES/EBU & coaxial digital inputs and outputs.

Auto track numbering from DAT S-ID’s and auto track increments from DAT, CD & DCC.

Balanced analogue XLR I/O’s plus AES/EBU & coaxial digital inputs and outputs.
New Technologies

The American National Association of Broadcasters' convention is the continent's largest broadcast-related event. DAVE FOISTER documents the latest developments in audio equipment for broadcast and postproduction.

Fostex CX-8
Fostex' commitment to the ADAT MDM format is underlined by a new recorder, the CX-8, joining the existing RD-8. It too has balanced +4dB outputs on a 25-pin D-connector, and features a new transport with faster wind times. A large multimode display and front-panel access to 44 function buttons make operation more flexible, and as ever the machine will integrate into any ADAT-type system with full compatibility as master or slave, complete with optical 8-channel interface. The absence of onboard time-code facilities means the machine is substantially cheaper than the RD-8. At the same time comes the Fostex D-80, 8-track, hard-disk recorder designed as a direct replacement for a tape-based recorder in an existing project studio.

◆ Fostex, US. Tel: +1 310 921 1112.

360 Systems Shortcut
Designed specifically for broadcast editing, the Shortcut is a portable hard-disk recorder-editor with dedicated controls for fast operation. Recording is 16-bit linear stereo, with internal drives available with up to three hours of storage. Familiar transport controls, a jog wheel, dedicated editing keys and a built-in waveform display make the unit completely self-contained—it even has a built-in microphone preamp and speakers. Digital inputs are also provided, and editing markers can be dropped on the fly during recording ready for the full range of nondestructive editing possibilities complete with an Undo function.

◆ 360 Systems, US. Tel: +1 818 991 0360.

apt codec & PC card
apt has released a new multiformat codec incorporating both apt-X compression and the new apt-Q developed with AT&T. The SCF 384 allows the more appropriate system to be selected for the job in hand, with apt-X suitable for studio-to-studio links at 384/336 kbit/s and apt-Q for lower bandwidths or situations such as one-shot audio delivery in broadcast applications. Also new from apt is an audio expansion card for PCs aimed at audio workstation and radio automation developers. The ADK200 supports simultaneous multichannel playback and record on a single card, with a choice of coding systems including apt-Q.

◆ apt, UK. Tel: +44 1232 371110.

Otari Elite
Otari's digitally-controlled Concept 1 console has been further developed into the Concept Elite, maintaining the same features of digital master section, symmetrical dual-input modules, snapshots and VCA automation, and adding new facilities. The EQ has been enhanced, image recall is now supported, and the processing power has been expanded to support the other additional features such as the multiformat panning section with automated joystick panners. The Concept Elite and the existing Status console will further benefit from the forthcoming Eagle automation system, which features full-colour graphical representation of faders and switches interactive with the console control surface. Finally, from Otari is Lightwinder system, providing an optical link between stage and console for reinforcement applications. The system comprises multichannel Stage Master and Console Master units connected by fibre-optic cable, and can handle up to 64 channels as 48 in/16 out. The Stage Master end incorporates phantom-powered mic amps and active parallel outputs for monitor splits, while the console end has a digital throughput allowing signals to be connected to FOH and recording consoles at the same time.

◆ Otari, US. Tel: +415 341 5900.

Intelligent Devices IQ
An intriguing new TDM plug-in from Intelligent devices claims to be able to match the spectrum of one signal to that of another. An existing track which needs to have its characteristics duplicated, or a mix which wants to be tonally matched to another, can be played into the process to be learnt; the material that is to be matched to it is also presented to the process, and IQ designs a mono or stereo FIR curve fit algorithm which...
**Waves TrueVerb**
Waves' latest TDM plug-in is a combination of room simulation and reverb which allows the user to define the size of a simulated room, the frequency response, and the distance from the sound source. Operating on individual or multiple tracks, the process uses 'psychoacoustic rules' and is claimed to give a persuasive perception of distance beyond the speakers.

**QSound QX/TDM**
QSound has responded to a demand for a TDM version of its soundfield expander process with QXTDM. The plug-in applies QSound's patented QXpander algorithm to Pro Tools material to move widely-panned elements outside the bounds of normal stereo speakers, and can be used to position mono sources or expand stereo elements or even complete mixes.

**Synchro Arts ToolBelt**
Offering a selection of non-real-time processes for Pro Tools users is ToolBelt from Synchro Arts, using a simple user-interface to produce combinations of the available processes. These include TimeMod time compression and expansion, Power Looping, reverse and invert, and an audio-generation process which produces fills and atmospheres from short source signals using chaos theory.

**Frame Master II**
The American Frame Master II time-code calculator attains revision 'II' status at NAB and now offers conversion between all time-code formats along with addition, subtraction, multiplication and division operations. The pocket-calculator style unit also has sync offset functions, count up-down timing and 14 on-the-fly edit points.

**Calculated Industries**
US. Tel: +1 702 885 4975.

**QSound, Canada.**
Tel: +1 403 291 2492.

**Quantegy **
Quantegy media
Quantegy, the company that has taken over the Ampex recording media lines, has launched its first new products, the first of which appropriately enough is the DV Series of digital video cassettes for use with the Ampex DCT postproduction system. Also in the video line is the Ampex DBC Series of digital Betacam cassettes, while on the audio front there are new tapes for 8mm digital storage and DTRS format recorders and enhancements to the CD-R range. Analogue sees developments too, as the archiving stability of Grand Master 456 is improved, giving a claimed life of 40 years.

**Quantegy, US. Tel: +1 415 903 1100.**

**Studer MADI router**
Studer used NAB to unveil a new MADI routing and processing system that enables multichannel digital signals to be connected between remote locations using simple cable runs. The network has a star topology, with a hub capable of handling a throughput of 1 Gbit/second, allowing systems of 1,344 by 1,792 or more crosspoints. The various peripheral components can handle analogue or digital signals, and simple mixing tasks such as crossfades and mono summing can be handled by the basic system. Further options allow more complex DSP functions such as EQ and compression-limiting. Control is from any of the CS range of control systems from simple keyboards to PC workstations.

**D&R Cinemix**
D&R will shortly be launching a new dedicated video, film and post console, the Cinemix. The desk features true LCRS planning and complete recall of all digitally controlled routeing-and-switching functions, including the 6-channel automated output section and automated joysticks. Channel specifications include dual signal paths with VGAs or motorised faders on both as well as two full EQs and automated mutes, and 12 additional automated functions, giving effectively 64 automated input channels on a 32-frame desk. A powerful routeing matrix allows access to up to 34 aux sends during mixing and access to the 24 buses from both signal paths, and an optional film module allows the use of stems during mixing. Monitoring is LCRS and the CRM option is a 6-channel digital attenuator with switching for up to three sets of control-room monitor systems and LCRS outputs.

**D&R, Netherlands. Tel: +31 294 418 014.
Can you afford to miss the Rupert Neve experience?

"CBC has tested many high-end audio consoles and we find that Rupert Neve's 9098 has the best technical specifications of any we have measured. Noise floor, dynamic range and distortion characteristics are absolutely superb and far exceed the requirements of digital recording technology as it presently exists."

Tony DuBoîce
Senior Engineer
Production Technology
CBC Engineering

"The 9098's sonic performance is stunning, being silent, transparent and noiseless and with that unbeatable masterful character which is the hallmark of a traditional Rupert Neve design. This console is a dream to use and is the standard to which all other audio equipment manufacturers should aspire."

Don Pennington
Technical Director
CBC Radio British Columbia

The Ultimate Analogue Console
Orban DSE 7000 and Optimod 2200

Orban's Optimod range of broadcast signal processors has a new low-price member, the FM 2200, designed to bring Optimod processing to smaller radio stations. Its features include eight programmable presets, 2-band processing with HF enhancement, protection processing, remote control and an alignment tone generator. The DSE 7000 workstation receives a major upgrade package, including a replacement DSP board with 24-bit internal processing and new v6.0 software, giving the system on-board digital effects. Many of the effects are specifically tailored to the broadcast market, and include Optimod compression, protection processing, digital delay, and Lexicon reverb. All new DSE 7000s will be shipped with the upgrade at no extra cost, and it can be retrofitted to existing units, recent purchasers being supplied with it free.

● Orban, US Tel: +1 510 351-3500.

Digidesign AudioVision

Digidesign has simultaneously announced two developments to the AudioVision postproduction system. AudioVision 3.6 is an upgrade to the existing system, centring on the addition of MediaShare, a networking solution providing multiple users with simultaneous access to any sound located on a central server. 3.6 also adds a new Varispeed Tool, emulating tape varispeed by varying pitch and duration simultaneously in order to simplify the process of pull-up/pull-down adjustments necessitated by the film-video transfer process. Looking further ahead, Digidesign has previewed AudioVision IV, completely redesigned to take advantage of RISC-based processing and PCI bus hardware. The system now supports 32-track playback with unlimited virtual tracks, and through its use of Digidesign TDM hardware it will also run any Digidesign software application including Post Conform. MasterList CD and Pro Tools III v4, which will include Sound Designer II functionality.

● Digidesign, US Tel: +1 415 842-7741.

Macromedia Deck II -SoundEdit 16

Designed to catch the attention of audio folk spread from radio to multimedia, Macromedia has paried up its Deck II and SoundEdit 16 as an integrated system. The package also comes with Director Multimedia Studio 2 and offers a single solution to digital audio recording and editing, and as a platform for third-party DSP processing.

● Macromedia, US Tel: +1 415 252-2000.

Spectral Express and Producer

New for NAB were Spectral's Express and Producer, both running on its Prisma digital-audio workstation. Both are user-interfaces targeting specific operators—Express is typically aimed at radio production where the need is for speed of operation or accessibility to relatively untrained operators, while Producer should appeal to the more rigorous demands of the audio production engineer. Spectral claims a 'radically different graphical paradigm' to be behind the look and feel of both interfaces.

● Spectral, US Tel: +1 206 487-2931.
Come and see us at AES Copenhagen. Stand 1K3, Hall C1

Focusrite Audio Engineering Ltd.
2 Bourne End Business Centre, Cores End Road, Bourne End, Bucks, SL8 5AS England
Tel: +44 (0)1628 819456 Fax: +44 (0)1628 819443

USA: Group One Ltd. 80 Sea Lane, Farmingdale, NY 11735 Tel: 516 249 1399 Fax: 516 753 1020
Group One West Coast: 310 656 2521 Canada: Sonotechnique Tel: 416 947 9112
The Road to

As we now enjoy a 'global recording community', the existence of the top-flight AR Studio complex in Rio comes as no surprise. But the details of equipment availability, regional legislation and local musical fashions contain many contradictions as Dan Daley reports.

From the Air, Rio de Janiero looks like a jewel—the statue of Christ The Redeemer, with arms outstretched atop Corcovado peak, overlooks a city of six million people hemmed on one side by towering, verdant mountains and sparkling beaches on the other.

Close up, Rio becomes a sequence of neighbourhoods decidedly Third World in their density and as precipitous as the faces of the surrounding mountains in their ability to change from slum to high-rise luxury. It is some of these neighbourhoods that have contributed their names to the culture of the century: Copacabana, a synonym for nightclub in the lexicon of the northern hemisphere, is a section of hotels and shops that derives its name from the coffee shops that used to characterise it (canga for cup and cabaça for small cottage) coffee house. Ipanema, a bit further down the road, has been immortalised in song, and as one drives past the beach, slowly in the dense traffic that seems to plague the resort sections all summer long, getting a chance to linger over the inhabitants of the local binkins, one realises that the composer knew very well whence he spoke.

But Rio—and Brazil—have contributed far more than cultural and romantic icons to contemporary culture. Bossa nova and samba, which continue to be staples of the regional music, have periodically infused western pop rhythms over the last 40 years while Gilberto Gil and Milton Nascimento continue to grace Latin and jazz charts in both hemispheres. An estimated national recorded music economy of $500m (US) indicates that music continues to be on a par with Brazilian coffee as a component of the country's economic and cultural life, domestically and for export. In Billboard (2nd December 1995), Brazil is credited as the region's largest music market, with a value of $700m in 1995, up 25% from the previous year's sales. Brazilian artists now have a 65% share of their own market against international acts, up from 60% the year before.

CD retail prices in the country range from $15 to $25, depending upon the type of outlet; cassettes sell for about half this. Brazil still has a significant record piracy issue to face, but labels say that it's being addressed. And while the romantic samba is still the country's primary genre, one record company executive was quoted as predicting a significant shift to rock and pop.

According to Paulo Junqueiro, Director of A&R at WEA-Brazil in Rio, since the passing of the economic crises of 1990, the country has seen strong sales for both major record labels—all of which have Brazilian operations headquarters in Rio—and fast-growing independent labels.

"But," says Junqueiro, "Brazilian recording studios have left a lot to be desired! He refers to the fact that historically Gil Nascimento and other Brazilian artists, producers and engineers have left the country to record once they achieved a certain level of success. In search of better technology and studios, AR Studios, which was completed in Rio in February, was designed to change that.

"What AR represents is a large step up for the entire Brazilian recording industry," says André Rafael, the studio's majority shareholder who owns AR with partner Toni Capone. "There have been studios in Brazil with good equipment, but never one that has high-level technology and world-class design combined into one place. This studio raises the ability and the image of Brazil as a place to make and record music.

Both Rafael and Capone are members of what is equally a band and an extended family. Their youth—Rafael is 23, Capone 29—is reflected in the fact that their entrance into the studio business started on a Tascam 688 8-track cassette deck a few years ago. A guitarist who is as at home on a nylon-stringed flamenco as on an electrified Parker Fly, Capone's rhythmic chops are on a level with his obvious enthusiasm and spiritual connection with the music.

'This,' he says, gesturing around the studio, guitar in hand, 'is simply what we do.'

The Main Studio. Studio A and its lounge, is located on the upper floor of the front building of the walled studio compound (offices are on the first floor), and is centred around a 60-input Neve V3 desk, equipped with Flying Fader automation. The console was bought secondhand and completely refurbished by Neve, which sent roving installer Steven Laisi to Rio to implement it. Main monitors are Genelec 1034A speakers, which are complemented by an array of close-field speakers such as the ubiquitous Yamaha NS-10s. The analogue-based facility has a pair of Otari MTR-90 Mk.III 24-track decks linked via a Timeline synchroniser and 24 channels of Dolby SR. Mixdowns are to an Otari MTR-15 quarter-inch 2-track. Although half-inch heads are available, quarter-inch remains the stereo storage format of choice in Brazil. (A Panasonic SV-3700 is also on hand.) True to Rafael's and Capone's project studio origins, an
Rio

June 96

Studio Sound 47

Alesis ADAT is available to interface with Brazil's growing population of home recordists.

Studio B is located in a second building, separated from the first—both are marked by terracotta plaster work and blue-stained coloured tiles; interior design consulting was done by Designer John Storyk's partner and wife, Beth Walters—a pleasant, sunlit courtyard. It occupies the first floor of the structure, which also houses its own café, and has a customised Mackie 32.8 desk with Ultramix automation and 26 additional channels of Neve, API and Aphex outboard inputs. DynaudioAcoustics PPM 3s are the main monitors; another Otari MXR-90 MK III is the main storage unit. Upstairs, Rio's first dedicated mastering factory is having the final touches put to it.

The mastering-editing suite will offer a 16-channel Digidesign Pro Tools system with 32-channel capability and 888 and 882 I/O modules, extensive TDM processing including a Waves bundle, Digidesign DPP-1, DNR, Mezzo backup, and a Masterlist CD system on a Mac Quadra 950 with 40Mb of RAM and two 4.2Gb drives. Mastering monitors are Snell System D speakers powered by Sunfire amplification. The mastering format rapidly becoming the standard in Brazil is PMCD; a Pinnacle CD recorder is in place, as are a pair of Sony MiniDisc recorders and Apogee AD1000 and DA1000E converters. AR Studios outboard is a mix of new and vintage; Neve, API, Pultec, Tube Tech, Focusrite, Urei and Lang are all represented in the racks behind each console. Signal processing includes a Lexicon 480L, Eventide DSE 4000 and H3000S, and an AMS DMX 1560S. The microphone cabinet is well-stocked, including Neumann valve mics, Sennheisers, Sony, AKG, Shure, Cole, EV and Crown. The studio's complement of guitar amps is equally notable, including some vintage Fender, Marshall and Mesa units. The overall size of the facility is 8,600ft.

WHAT SETS AR apart from the Rio pack is the fact that it has a contemporary equipment complement combined with accurate acoustical engineering, a combination that the city has previously lacked—according to Storyk. He was contacted by AR's management team in 1994 about the possibility of bringing a contemporary studio design to Brazil, a region that had been fascinating him for some time. 'Between its language and its size, it's like a world unto itself,' he says of Brazil, which has nearly the same land mass as the continental US and which is distinct from the rest of Latin America by way of its adherence to the language of its Portuguese colonisers. What Storyk found was the original front building being used as what he called 'an official rehearsal studio' by Rafael and Capone's band. The major design elements called for the complete reconstruction of the building: done by the local Irma Ribeiro Gutierrez Ingenharia, with only two of the four outer walls remaining from the original structure. It also originally called for placing the studio on the ground floor, although ultimately moving to the building's upper level allowed more natural daylight in to the studio rooms.

'It's a classic 5-8 man rhythm recording studio,' Storyk says of the recording room design, which includes two interior isolation booths as well as a large sound lock which serves as a third isolated microphone area. The L-shaped room is designed in such a way as to permit, via angles and glass in iso booths, excellent sight lines between all the spaces, which Storyk, who came to studio design via careers as an architect and a musician, describes as a characteristic of his rooms. The bright sounding (RT60 of approximately 0.4s at 1kHz) recording room has active taping in the upper portions of the high, angled ceiling, which itself has a cloud suspended from it and which allows for various live room microphone placement. 'We integrated diffusion extensively throughout the design, particularly in the control room,' he explains. The 500-plus ft. geometrically complex room faces out on the larger portion of the studio. Its rear wall is dominated by a large custom diffraclat, manufactured by RPG out of wood and aluminium. Like most of the acoustic treatments used, this was imported from the US. The RPG unit is a full-frequency diffuser and increases the spread of the room's listening area to about six feet across the console position as well as lowers in frequency the diffuse field in this area. The room also reflects Storyk's dislike of dead-sounding control rooms; ARs' room measures at approximately 0.3s (RT60 at 1kHz with less than 10% deviation per octave through the entire frequency spectrum).

'There seems to be two camps when it comes to this particular specification in control-room design,' he says. 'One camp suggests very dead control room environments, the other, which I belong to, suggests more room ambience and naturalness. What makes that possible is creating a uniform frequency and time-domain monitor system response at as wide a listening position as possible while not giving up room reflections. Geometry is the single key design tool for this, not absorption.'

Storyk adds that the decision to put the studio on the upper floor of the building also gave him more ceiling height—5m in this case—to work with. 'Which allowed me more play with the surface treatment selections as well as amount of glass between studio and control room. The main studio monitoring system (Genelec 1034A) was tuned by Storyk and associate Sam Berkow using Berkow-developed transfer-function-analysis software currently being brought to the marketplace by JBL. Once in the studio, there's nothing to indicate that you're in Rio de Janeiro, a comment to which Storyk, who has done rooms in Malaysia, Argentina, India in addition to North America, responds that, 'The world is now Compuserve-close. For a while much of my design work was being done via fax, and I thought that was great. But once I started working over the Net, then that made the fax look slow and outdated. The thing about what a world-class studio should be is, you can fly 11 hours from New York, walk through floods [Rio suffered lethal rain-induced flooding the week the studio was christened] and once you enter the studio, not know which city you're in—it could be New York, it could be London. It just happens to be Rio.'

From another perspective, Latin America in general and Rio in particular seem to be heading towards upswing cycles. The dance-
FACILITY

Music subgenres that dominate charts in Europe and Asia lend themselves to the rhythmic, contrapuntal basis of Brazilian music. The local economies, governments and social structures are stabilising—Brazil had an annual inflation rate of as much as 200% just five years ago; all major western labels are represented in South America's leading countries, and, as Storyk points out, Argentina once had a thriving domestic and export record industry in the 1950s, before the excesses of the Peron years. (Which, ironically, were being recreated by Madonna and filmmaker Alan Parker in Buenos Aires that very week during the shooting of the movie version of the Broadway musical Evita.)

For What It's Worth. Latin America is wary about how its culture is being portrayed in North American media; the choice of Madonna as Eva Peron incited protests in Argentina, as did the request by Director Spike Lee to use Rio's slums as one of the backdrops for his shooting of Michael Jackson's newest video literally the same week.) In rightwing Brazil—perhaps some in Brazil—including Rafael and Capone—would like to see more of the country's artists, such as Gil, Nascimento, Brazil's leading rock act Paralamas Do Sucesso, as well as producer-engineer like Antonio (Moogie) Canzino, who now works in LA, remain here to record more of their records, and that is the larger challenge that the studio addresses. Just the notion of such a facility in Brazil may have already hit the ball rolling; local reggae-pop band Skank, whose first two recordings sold in excess of 1 million units regionally, has changed plans to do next record in the US in favour of using AR. And at approximately $132 (US) per hour, the studio has already booked itself six months starting with quadruple-platinum (250,000 units constituting platinum sales in Brazil) Brazilian rock band Legiao Urbana in February, whose guitarist, Dado Villa-Lobos, says the establishment of a studio like AR in Brazil will definitely make the capacities of the country's artists and will keep more of their projects there.

'So many Brazilian artists go to LA to record now,' he says. 'We would rather stay here where we have the structure and the facility we're familiar with. It was hard to do that without a studio like we could get in the US.' John Storyk notes that, while India has its own pro-audio magazine, South America has yet to have a significant locally produced version. This underscores the fact that, while AR is a big step in the direction of retaining the work of its leading recording artists, building a world-class facility in a place like Rio is no small feat. A significant part of the estimated $3m that it took to build AR went into the purchase of basic building components like power outlets and gypsum sheet rock, which was actually more expensive to import rather than buy locally, according to Alvaro Alencar, AR's technology consultant and assistant studio manager. (Workwood like the mahogany used externally throughout the facility, was made locally.) Alencar, a Brazilian citizen who also works as an engineer at New York's Room With A View studio, gets an interesting, bi-hemispheric perspective on the studio's power. 'There's no spare parts to be had here, no rental services, and major import duty issues to deal with when you're bringing equipment in,' he says, duties of as much as 30% which contributes significantly to the studio's final cost. On top of that, most of the technical talent to even get the studio to an opening stage had to be imported, from Storyk to Lai for installation. 'There's not been much of a technical tradition to rely upon in Brazil,' he observes, adding that he as an assistant engineer, candidate training at Full Sail's school in Florida as we speak. While some major equipment manufacturers are significantly represented in South America (SSL, for one, which has three installations in Brazil), most of the equipment was ordered on trips by Alencar to the States. 'I get as many schematics as I can for future maintenance,' he explains. 'And based on knowing what usually goes wrong with a piece of equipment, I keep a supply of spare parts on hand. Also, we ordered more than one of a number of pieces, so that if, for instance, a Urei 1776 goes down, I have a dozen of them to shift around and that gives me more time to fix the down one. You can't count on 24-hour delivery here!' Alencar also notes that he was able to buy a significant amount of the studio's vintage outboard locally. Brazil, like the former Eastern Bloc nations, had scoured away many pieces over the years. The problem with them tends to be corrosion due to the climate.) As one could imagine in a city that runs on a rotary telephone system, mains power can be sometimes unreliable. The studio's power is conditioned and a 40-minute no-break reserve is installed between the studio and the power company substation, which, thanks to Rio's arcane utility regulations, the studio actually had to buy for itself, even though it does not actually own it. The overwhelming awareness of maintenance in a place like Brazil is self-reliance. For instance, Alencar and Neve installer Steven Lai had to adapt the Timeline synchroniser to work with the Neve's Flying Faders automation, which is default to the AS2600 synchroniser. Lai, who worked for Neve for seven years before becoming a freelance installer for its consoles worldwide, notes that the V3's power supplies had to be modified to accommodate the local 127V current. He also had to rearrange the studio's star-ground system to match the local utility's 2-phase wiring approach. Lai, who has been doing increasing numbers of installations in such offbeat locations, observes. 'As the amount of installations go up globally in places like this, you wind up having to become an expert in every area of audio, not just the console itself. Everything that console connects with, even peripherally, you have to know what that interaction is going to cause.' But as trying as the entire process of setting up a world-class studio in a city like Rio can be, the shakedown cruise of the facility's main room was worth it for Rafael, Capone and Alencar, as well as the rest of the studio's staff. Eddie Kramer, a long-time friend of Storyk but perhaps better known as the guy who engineered records for Jimi Hendrix, Led Zeppelin and Traffic, to name a few, came down for the room tuning in mid-February. He did a 3-day test session with Rafael's band, moving microphones around, looking for the sweet spots in the room. By the third day, Kramer, whose usual fastidiousness about every aspect of a session being spot-on is reflected even in the precise handwriting he uses to label the console inputs, was being referred to by Capone as 'our guru.' Kramer was clearly taken with the intimacy that resonates throughout the place. He not only placed every mic himself and patiently explained the placements to the staff, but was seen at one point helping Capone lug a hefty SWR bass cabinet into the iso booth, in the middle of which process he turned and smiled dryly through his neatly trimmed, grey-flecked beard, 'I'm a roadie, too.'

While Storyk and Berkow worked on tuning the monitors, Kramer and the band worked long hours all three days, and he took only a few pink-noise-induced time-outs, during one of which he revealed his keyboard chops by expertly morphing from a Bach invention into a free-form jazz piece. He had good things to say about the studio, from comments on its acoustical isolation (NC20 or better throughout, according to Storyk), and the sound of the control room ('Fucking awesome'). But he reserved his highest praise, typically understated but punctuated with a raised eyebrow, for the crew at AR, saying, 'I'll definitely be back.'
"The Father of British EQ has just made the Mother of all Consoles"

For good advice on your next mixer you can't beat an independent magazine round-up. Yes, you've guessed it. The quote above is an independent summary on John Oram's BEQ Series 8 desk*. Look below. There's its big brother, the BEQ Series 24 Console.

BEQ? It stands for British EQ. Throughout the world, John Oram is known as the 'Father of British EQ'. It's no surprise, British artists like Queen and The Beatles (with Vox amps), Dire Straits and Elton John (with Trident consoles) and Eric Clapton (with Martin guitars) have taken John Oram's EQ and circuit design philosophy to every corner of the globe.

Not that you have to be a millionaire to enjoy the warm, musical sound of Oram Sonics® and the ultra low noise characteristics and reliability of SMT (Surface Mount Technology).

From rackmounts like the Oram MWS (Microphone Work Station) and the HD EQ 2 (High Definition Equaliser) to the Oram BEQ series desks the same tag applies:

Serious sound, sensible price.

* Source: EQ magazine March 1996, "Console 96" round-up.

Tonewood Studios, Burbank, California

- EQ Magic - High & Low with Switchable shelves
  - 2 Swept Mids - variable Low Cut filter - High Cut & Bypass
- Oram sonics® super low noise electronics throughout
- 10 Aux sends per channel, 10 FX Returns with 2 band EQ
- Unique Triple Aux - Allows connection to 30 FX with level control
- 100 mm Main Faders - factory or retro fit any Automation System
- 60 mm Monitor fader with 2 band EQ - Fader and EQ Flip
- 112 Inputs to Mix bus with 32 Input console
- Fully Modular, 3mm Aluminium panels with Nyloc Fasteners
- Noise gate on every channel
- AFL Solo in Place

Blue Ribbon Award Winner 1995 Oram BEQ Series 8 Console

ORAM
PROFESSIONAL AUDIO
2 East Terrace
Gravesend
Kent
DA12 2DB
England
tel +44 (0)1 474 535 888
Fax +44 (0)1 474 560 250
E-mail: 101325.1646 @ CompuServe.com
In twenty years he has progressed from tea boy at Morgan Studios to being one of the most critically acclaimed pop music producers. His rise to prominence has been a mixture of judgement, good luck, and some vintage equipment. SUE SILLITOE talks to Mike Hedges at his Normandy chateau facility

**THE RECORDING INDUSTRY** is full of large characters, but if we’re talking literally then there are few who come much larger than super-hip record producer Mike Hedges. When Everything But The Girl worked with Hedges on their orchestral-based album *Baby, The Stars Shine Bright* they joked that he was the obvious choice: they were looking for a big sound so they thought they’d better get a big guy to produce it!

With Hedges standing at well over six feet tall and built like a brick outhouse, you can see what they meant. Yet despite his formidable appearance he is actually a gentle giant renowned for his kindness, charm and exceptional good humour. He is also one of the most talented producers around, so it’s no surprise that he is in constant demand. Many bands come back to record second, third, fourth and even fifth albums with him.

Mike Hedges has been making critically acclaimed records for nearly 20 years, yet he remains one of those rare producers who is very hard to categorise because the projects he handles are so diverse. A quick look at his CV reveals a zany mixture that takes in classic left-field pop from the likes of The Cure, The Associates, Wah!, Bauhaus, Siouxsie & The Banshees and The Creatures through to seriously radio-friendly, internationally marketable material from artists like The Beautiful South, Alison Moyet, Texas, Marc Almond and McAlmont & Butler.

Many of these projects have resulted in massive hits—the most recent of which is the Manic Street Preachers single *Design For Life* which sold over 250,000 copies in the UK alone and entered the charts at No. 2.

**REMEDIAL ACTION: HEDGES ON THE CURE**

With many of the albums he has produced—in particular those recorded with The Cure and Siouxsie & The Banshees—Hedges is credited as coproducer. This is because he feels most production is in fact a coproduction that demands equal input from the band and the producer. With The Cure and The Banshees it really was a coproduction and I was happy to have my work credited as such.

Even now, it is clear that the sessions Mike Hedges did with The Cure remain among his favourite. His initial involvement with the band came about when producer Chris Parry backed into Morgan to do the first album and asked for an engineer to be provided as part of the deal.

'I was the cheapest engineer Morgan had, so I got the gig,' he laughs. 'Also, I’d heard of the band and I thought they were brilliant. I'd seen them play at a pub in West Hampstead when they were supporting Adam And The Ants, so I was really pleased to get a chance to work with them.'

Parry produced the first album, but for the second and third albums Robert Smith decided to go it alone and asked Hedges to act as coproducer.

'These sessions were very intense. Seventeen Seconds was recorded and mixed at Morgan Studios in a matter of weeks, while the third album, Faith, was recorded at Morgan and Abbey Road and mixed at Morgan and Red Bus because by that stage Hedges was starting to establish himself as an independent producer.'

He has also just produced their biggest selling album to date, *Everything Must Go*.

HEDGES BEGAN his recording career in the mid 1970s after leaving school and landing a job as a tea boy at the now defunct Morgan Studios. He says: ‘When I went for an interview the studio manager, Martin Levan, asked me three questions: ‘Have you ever been in a studio? Do you know anything about multitrack recording and are you in a band? I answered “no” to all of them and thought I’d blown it, but instead he said: “When can you start?” It turned out that he was looking for a complete novice because he preferred to train his staff from scratch.’

Thanks to some lucky breaks, Hedges progressed from tea boy to tape op, engineer and finally producer within the space of just two years. ‘The major advantage of being the lowest of the low is that you get grounded in the psychology of the session’ he says. ‘You learn that there are certain things that should be said at certain times by certain people. Other people, apart from the musicians, involved in the session shouldn’t say anything unless their decision is asked for. If a musician is nervous and is taking a while to get something right the last thing you need is the tape op saying: “Oh, that bit was out of tune wasn’t it?” or laughing about something else and not realising that the situation is really tense’.

Although some musicians can be a bit nervous, Hedges believes that most bands are incredibly strong and sure about what they want. His role, he feels, is to interpret their views in order to get the sound they are after.

He says: ‘Artists use many different ways to explain the sound they want. Some are technical but others say things like: “I want the guitar to sound like a pair of scissors cutting through paper and then opening up again.” It’s not very specific but you just have to use your imagination.’

By 1982 he was able to set up his first commercial one-room recording studio, Playground, which quickly became one of the busiest studios in London. Hedges was involved with Playground for a few years but eventually gave it up to become truly independent, working at any studio that took his fancy, although his natural inclination was to use Abbey Road because he felt—and still feels—that it is one of the best facilities in the world.

These days, however, Mike Hedges is usually to be found at his studio in France, working with long-time associate and ES...
I fell in love with the sound of the old EMI TG consoles in 1981 when I was working at Abbey Road's Studio Two with Siouxsie & The Banshees'
INTERVIEW

Freelance engineer Ian Grimble who has engineered many of the hits. He set the studio up six years ago because he wanted a permanent home for his two vintage EMI consoles.

**THE CONSOLES** are clearly an important part of the Mike Hedges sound as virtually everything he has recorded in the last four years has been done at his studio. He says: "I fell in love with the sound of the old EMI TG consoles in 1981 when I was working at Abbey Road's Studio Two with The Banshees. We did two songs there and miked everything up with about 25 old valve mikes just to see what would happen. It was amazing—we certainly didn't need much compression! We were experimenting, really, and we thought we'd try as many valve mikes as possible simply because Abbey Road had so many."

Soon after that Abbey Road took the console out of studio two and stored it away, but Hedges never forgot how good it had sounded. A few years later, when he was back at the studio with another project, he saw a mobile version of the TG console in a cupboard and asked if he could buy it. He says: "I got it home and started using it, but the first thing that became apparent was that I really needed spare parts. I asked Abbey Road if they could help and they said they had a garage full of spares which turned out to be the old studio two console which was in bits."

Hedges bought the console and with his wife Jane, he reassembled it, cleaning all the knobs and connections and putting it back together like a mahogany jigsaw. "Phil Hancock—one of the technicians at EMI—helped us during the final stages because the main 50 and 80-way plugs were quite finicky. When we had got it all back together he said: 'Shall we switch it on and see if it smokes?'. But it didn't—it just lit up. It was marvellous!"

Mike Hedges never intended to own another studio but when the artists he was working with started taking over the living room and dining room of his flat in Willesden just so that they could use the console, he felt the time had come to move. "Everyone who used the desk loved it," he explains. "It has built-in compressors and EQs and sounds so individual that it seems a crime not to use it."

After months of house-hunting Mike Hedges finally found the ideal location—a chateau in Normandy which was quickly turned into a residential studio with a large control room on the ground floor and various ground floor and basement recording areas. All of the ground floor rooms have natural daylight and on sunny days the control room windows are thrown open because the house is isolated enough to be removed from extraneous noise. Mike Hedges designed the facility himself—with some telephone input from Andy Munro who was on call to sort out any acoustic problems. "It was initially going to be for my own projects because I didn't want to keep travelling," says Hedges, "but it is now fully commercial, although I tend to book it quite a lot of the time because I love working here."

Over the years Hedges has amassed a collection of equipment that is now permanently installed in the facility. "I've pored over the back issues of Studio Sound for years because I love seeing what's for sale. I don't just buy old valve stuff and I'm certainly not a vintage equipment nut, but I have got some pretty weird things—four Vocoders, for example, and some unusual mics that I've picked up secondhand."

**HIS MICROPHONE COLLECTION** includes a hybrid Neumann U47 that has a U47 serial number but a Telefunken badge. He says: "It's a mixture of everything—God knows what's in it—but it sounds fantastic and I use it all the time."

Another favourite is the Sony C800G valve mike which gets used for everything, particularly acoustic guitars. Hedges is also an advocate of the Sennheiser MKH series, especially the MKH 40 and 32 hand-held vocal mikes. He says: 'They are the workhorses and we use them a great deal because they give very high gain with very low noise.'

For monitoring, Hedges only uses close-fields and his preference is for the DynaudioAcoustics M1 system and B&W 1200s. He says: 'I don't think big speaker systems are relevant anymore because we are all making music that will be played on relatively small home hi-fis."

'I tend to use B&W 1200s and Dynaudios for the actual mix. We put it through the DynaudioAcoustics system because it is incredibly accurate and doesn't jazz up the sound. With the B&Ws and Dynaudios you have to work quite hard to get the mix right.'

The Twang dynasty: Mike Hedges' collection of classic guitars

'This is certainly not a vintage equipment nut, but I have got some pretty weird things—four Vocoders, for example, and some unusual mics that I've picked up secondhand.'
IN INTRODUCING THE LIBRA MUSIC CONSOLE

A NATURAL

The seventh sound wave has arrived. Libra is the new digital console from AMS Neve, with a straight ahead musical bias.

Fully automated and entirely digital, Libra takes the maestro features of its six predecessors and adds phenomenal musical ability, at a midrange price.

Worldclass technology designed and configured by those who write the digital score.

Sounds like you've got to have a demo.
the eight tracks and adding a 2-inch headblock. It runs at 15 IPS with Dolby A. "We also have a 16-track 2-inch and a modern Studer A80 24-track 2-inch that runs at 15 and 30 which we use at 30 IPS with no noise reduction, so there's plenty of variety. On top of that we have a 32-track Pro Tools so we aren't retro! In fact I think we are very un-retro," Mike Hedges feels that the digital Pro Tools system is a great addition to his studio. He says: "I prefer not to record digitally because I don't like the sound of it. Analogue does sound better and there are some things you can do on analogue that you can't do on digital—recording at half speed, for example, or at double speed or backwards. It's a very tolerant medium."

---

**Mike Hedges' vintage EMI TG console at home in the control room**

---

**CHOOSY SIOUXSIE - SIouxie & the Banshees**

---

**EVER SINCE I HEARD**

---

**Cure at Abbey Road while we were doing their third album, Faith. Soon after that I opened Playground studio and in order to get to work with The Creatures I said they could come in for free. I was just desperate! We did a three-day session—the first Creature EP Mad-Eyed Screamer. They got on well with the studio and with me and soon after Siouxsie & The Banshees came back to come back to record Kiss In The Dreamhouse. Siouxsie and (drummer-husband) Budgie have gone back to being The Creatures again and they asked me if I would record their next project, but unfortunately I just don't have time. They came and spent a few days with us recently to talk about it and if it had been at all possible I would have leapt at the chance. But it wasn't—not this time anyway.' (duh!)—Ed.)

---

**INTERNATIONAL DISTRIBUTORS**

---

**AUSTRALIA**

Amber Technology Pty Ltd.  
Tel. (02) 9751211 Fax (02) 9751368

**AUSTRIA**

Audio Sales Ges.m.b.H.  
Tel. (02236) 204030 Fax (02236) 432332

**BELGIUM**

A. Prevost S.A.  
Tel. (02) 2162025 Fax (02) 2167064

**CANADA**

TC Electronics Canada Ltd.  
Tel. (914) 457-4044 Fax (914) 457-5524

**DENMARK**

John Peschardt A/S  
Tel. (86) 240407 Fax (86) 240471

**FINLAND**

Moderato Oy  
Tel. 90 340 4077 Fax 90 340 4082

**FRANCE**

Bom Studios  
Tel. (01) 3496065 Fax (01) 3845755

**HONG KONG**

Dan Hong Kong Ltd.  
Tel. 2801611 Fax 28733911

**INDONESIA**

Multi Audio Perkama  
Tel. (201) 6296004 Fax (201) 6298453

**ISRAEL**

More Audio Professional  
Tel. (03) 6966367 Fax (03) 6965007

**ITALY**

Audio S.r.i.  
Tel. (02) 273002 Fax (02) 2309018

**JAPAN**

MTC Japan Ltd.  
Tel. (03) 5280-0251 Fax (03) 5280-0254

**KOREA**

Young Nak So Ri Sa  
Tel. (02) 5144567 Fax (02) 5140193

**LEBANON & SYRIA**

AMAC S.r.l.  
Tel. (06) 430362 Fax (+1212) 678-1989 (US#)

**MALAYSIA**

Eastland Trading (M) Sdn Bhd  
Tel. (03) 9845789 Fax (03) 9842288

**MEXICO**

Electroingenieria en Precision S.A.  
Tel. (5) 559767 Fax (5) 5753381

**NETHERLANDS**

Electric Sound B.V.  
Tel. (036) 536255 Fax (036) 5368742

**NEW ZEALAND**

South Pacific Music Distributors  
Tel. (09) 4431233 Fax (09) 4432529

**NORWAY**

Englund Musik A/S  
Tel. (047) 67148090 Fax (047) 67113509

**PORTUGAL**

Audio Cientifico  
Tel. (01) 4754348 Fax (01) 4754373

**SAUDI ARABIA**

Halwini Audio  
Tel. + Fax (02) 6691252

**SINGAPORE**

South Pacific Music Distributors  
Tel. (09) 4431233 Fax (09) 4432529

**SOUTH AFRICA**

EMS  
Tel. (011) 482 4470 Fax (011) 726 2552

**SPAIN**

Media-Sys S.L.  
Tel. (93) 426500 Fax (93) 4247337

**SWITZERLAND**

Audio Bauer Pro AG  
Tel. (41) 4322320 Fax (41) 4326558

**TURKEY**

Linfair Engineering & Trading Ltd.  
Tel. 2 321 454 Fax 2 393 2914

**THAILAND**

Lucky Musical Instruments Co. Ltd.  
Tel. 251 3319 Fax 255 2597
A stage will look the same world over.
The artists that perform on it and the engineers
behind them will be different.
But one thing key engineers rely on worldwide are
the products from beyerdynamic.

Rob Colby and Yves Jaget cannot
afford to make
any errors with
unreliable
equipment.
The audio quality,
the transmission,
and simplicity of
use of the product
must be top notch.
It is for these
reasons that Colby
and Jaget prefer
to use products
manufactured by
beyerdynamic.

For their wireless
applications, their
favourite is the
UHF U 700 system.
When their clients
prefer to go hard-
wired, or when
miking instruments
the TourGroup
series of mics are
their choice.
beyerdynamic have
a microphone for
every application a
sound engineer
encounters.
Take it from two
professionals who
have a reputation
of their own to
maintain.
beyerdynamic. The choice of the
professionals.
and if you do overload the tape you tend to get tape compression rather than distortion, whereas with digital if you overload the tape it doesn't sound good at all!

He adds that although he wouldn't want a tape-based, digital, recording system, he is happy with his hard-disk system because it offers some amazing facilities. "Obviously you can do things with a hard-disk recorder that you can't possibly do on analogue and that's what we use it for. I like being able to chop up all the parts of a song and then quantise it which sounds totally bizarre and unnatural. But sometimes that's what you want!"

Hedges says Pro Tools really comes into its own when he has a difficult backing track to sort out. He explains: "The important thing about backing tracks is to go for the take—the best take. Sometimes it will happen immediately and other times it will take a while. But it's not a good idea to keep the hand going and going because eventually they start to flag.

In that situation what we tend to do is go for the best take possible on the 16-track and use the Pro Tools to edit any part we are unhappy with either by tone correcting it or by taking relevant bits from other takes.

"You have to be careful, though, because it's easy to get so tied up in the system that you forget what you're listening to and it's more like, 'Oh my god, it's new!'"
Okay, bragging is too strong a word. But we are very proud when one of the most important, rule-breaking producers in recording history has become a Mackie 8-Bus fan.

After all, Eddie Kramer’s role in the making of popular music has changed its sound forever. His recipe? “Make a record unlike anything that’s ever been heard.” So, while other engineers in London were churning out England’s formula Pop of the Day, Eddie Kramer was across the console from a strangely-dressed young man from Seattle named Jimi Hendrix. Together, they broke practically every sonic and musical rule in sight. The result was an aural legacy of such originality that it still sounds amazing — even revolutionary — a quarter century later.

Eddie hasn’t gotten any more conservative over the years. So it’s not surprising that a man with Kramer’s receptiveness to change would add a 32×8 to his creative arsenal. A mixing console that costs hundreds of thousands less than those he’s worked on for most of his awe-inspiring career. A console he says he likes for its “sweet E0, dynamic range, and cleanliness.”

Eddie wanted to do more than just take advantage of the creative and lifestyle options afforded by the project studio revolution. He also wanted to help DRIVE it. So a year ago, we agreed to lend Eddie a 32×8 in return for his feedback. Since then, we’ve learned Eddie is not shy about expressing his opinions. Luckily they’re mostly good.

And Eddie Kramer recommends Mackie consoles to his associates, too. In these cynical times (when pop stars accept millions to “endorse” products they admit later to having never tried), we at Mackie Designs think that’s the only kind of “endorsement” worth having.

If you’re in the market for a serious but affordable mixer, we hope you’ll take a close look at the only 8-Bus console Eddie Kramer says is worth having.
that it quickly becomes Slow Tools instead of Pro Tools. That's the trouble with computers—they can slow things down just as much as they can speed things up!

A RECENT ADDITION to the Hedges equipment collection is the Focusrite Red range of EQs and compressors. Hedges bought Reel 1, 2 and 3 after trying various outboard EQs and finding that they were the only ones that sounded good with the EMI console.

He explains: 'The console has a very specific EQ sound and for some reason all the other EQs we tried didn't balance in well with what was coming through the console. They sounded fine on their own but just sounded odd with the desk.'

'The Focusrite racks are great, though. Maybe it's the warmth of them that makes the difference. Whatever it is we felt they were ideal because they are very usable and modern and have a very high top end. They match well with the other equipment we use and everyone loves them.'

Hedges is amused that so many bands like Focusrite for its looks as much as for its sound. 'You would be surprised at how many people buy things because they look lovely,' he laughs. 'The clients come in and say "My God, those are fantastic—don't they look lovely" and we reply "yes, they are extremely good—and they also sound nice!"

The Focusrite equipment was a fairly substantial investment for Hedges who doesn't usually buy new gear because it depreciates so quickly. But as they are used all the time he feels they were well worth the money. 'I just had to rip my wallet open for them,' he says, 'and I'm really glad I did.'

WITH SO MANY projects under his belt—and plenty more in the pipeline—Hedges is convinced that diversity is the key to remaining busy as a producer. He says: 'I don't specialise in any one musical genre which is probably why I'm so busy. Last year I only managed to take ten days off in total and that was really too intensive. It was all getting a bit much, so this year I've decided to cut back a little. It has meant turning down one or two projects I would have killed for, but you have to stop eventually or you end up killing yourself!'
You will love the Wizard M2000. This digital multi-effects processor is specifically designed for the artist within you. Based on the unequalled DARC™ chip, the two independent engines deliver uncompromising effects, meeting the high performance demands of your ears. The clarity, density and feel is beyond anything you have ever experienced before. It will lift your music to the highest quality level.

We realise that you are busy creating music. TC’s engineers are artists themselves, and have therefore gone to great lengths to make the M2000 intuitive and easy to operate. For example, with the ‘Wizard’ function you can find the best presets in any given situation; and all parameters are maximum one menu level away - no more searching through multiple menu levels.

M2000 - Combine your artistic skills with science and create magic.

Wizard | M2000
Art + Science = Magic
A SMALL SELECTION FROM OUR LARGE STOCK OF USED EQUIPMENT

NEVE 36 CHANNEL CLASSIC CONSOLE

fitted with:
18 x 1081 Classic Discrete EQ Channels
18 x 1064 Classic Discrete EQ Channels
Patchbay

£POA

SOUNDTRACS

SOUNDTRACS JADE
Soundtracs Jade 48 -Dynamics, p/bay, automation on 64 faders (96 inputs on faders) £32,995
Soundtracs Jade 32 channels, p/bay, dynamics, automation (64 automated inputs on faders) £25,995

SOUNDTRACS SOLO LOGIC - NEW!
Soundtracs Solo Logic Consoles NEW with Automation 32 Channels (72 inputs in remix) New £4,500

SSL

SOLID STATE LOGIC
SSL 4000E 40 frame fitted with 32 channels, rh patchbay £39,995

RECORDERS (USED)

ALESIS
Alesis A-DAT £1,995
Alesis A-DAT new £2,250

AMPET
Ampex AQ410 8 track £1,995
ATR109 1/2" heads £4,995
Ampex ATR124 24 track POA

OTARI
OTARI MX80 24 track recorder with remote, private use, immaculate POA

REVOX
Revox M99 Mk2 £995
Revox A77 needs attention, sold as seen £95

SONY
Sony 3324 24 track digital with remote £11,995
Sony 3324A private use, very low hours £24,000

STUDER
Studer A80 24 track £11,995
Studer A80 transport remote, model 10-403 001 02 new POA

TASCAM
Tascam AT80 24 track, rem/autolocator, VGC £9,995

N D I G I T A L  R E C O R D E R S

Part exchange your old recorder for one or more of these excellent machines at new low prices.

CALL 01462 490600
NOW FOR MORE INFO

WANTED

NEVE, SSL, STUDER, OTARI

TELEPHONE OR FAX

FOR THE BEST NEW & USED AUDIO EQUIPMENT

TEL: 01462 490600  FAX: 01462 490700

www.americanradiohistory.com
Choose a valve signal processor from TL Audio and you're assured outstanding quality and the acclaimed warmth which only TL Audio Valve Technology can deliver.

The question is, which series to pick - Indigo or Classic?

Not an easy choice, as both offer a combination of superb design, quality manufacture and unique sound.

It's more a question of application.

The Indigo range offers intuitive, easy-to-use valve processing at an incredibly affordable price, whilst the Classic products feature superb on-board mic preamps and unparalleled control of all signal parameters.

The choice is yours!

**SASCOM MARKETING GROUP**

**Canada & USA:**

Sascom Marketing Group

Tel: +1 905 - 469 8080

Fax: +1 905 - 469 1129

WEB: www.sascom.com

---

**TL Audio**

---

Alex Harrow - Abbey Road Studios (good recording engineer): "The V1 series helm sound quality sounds like a well-damped valve, it goes to the limits. The control that the EQs, Pre Ams & Compressors are all superior."
Back In The Ring

Kept in the can since its recording in 1991, a 4-channel, high definition, surround version of the acclaimed Barenboim-Kupfer recording of Wagner's 'Ring' cycle has recently been released.

JONATHAN KETTLE discusses the problems facing this, and future, mixed media releases.

WAGNER CHANGED the face of opera. His tetralogy, The Ring, remains one of the most controversial pieces of music theatre ever conceived. The epic qualities of Das Rheingold, Die Walküre, Siegfried and Götterdämmerung were memorably captured on John Culshaw's audio landmark recording for Decca. Conducted by George Solti, the performances are matched by Culshaw's imagination to a vividly dimensioned production. More than any other classical music recording of its day, it revealed the extraordinary potential of 2-channel stereo.

Thirty years on, Unitec's HDTV recording of the acclaimed Barenboim-Kupfer production of The Ring—made at Bayreuth, the opera house Wagner built to stage his own works—has also helped extend technical and artistic boundaries. With remarkable prescience Unitec made a 4-channel audio mixdown for this 1991-92 recording. Surprisingly Teldec, which has licensed the recording, has not yet issued the surround-sound recording on any of the current carriers. For the moment only 2-channel stereo is available on the Laserdisc, VHS video and CD audio releases.

Unitec and Teldec finally unveiled the HDTV 4-channel audio recording to the British public this Easter. The venue for this UK screen debut was London's Queen Elizabeth Hall, and the organisers went to town commissioning a team of specialists to provide an appropriate quality of audio and video reproduction. ATC Loudspeaker Technology installed an array of its monitor speakers to match the HDTV video image projected onto the 40-foot x 20-foot video screen at the QEH. All of which begs several questions: Which format of HDTV master did Unitec issue for use at the QEH? How did this master differ from those used to make Teldec's VHS, Laserdisc and CD releases? What were Unitec's original priorities when making the recording? And can we expect Unitec and Teldec, in due course, to capitalise on their production foresight by releasing The Ring to spearhead the launch of surround sound DVD?

Wagner stories are usually tortuous and this one's no exception. So before getting embroiled in the release format masterings details, let's concentrate on the Easter presentation at the Queen Elizabeth Hall.

The audio and video signal source turned out to be the 300MHz D1 large format helical scan unit. D1 is the preferred signal fed to each channel from ATC's new SCA2 preamplifiers. Two of these preamps were used to provide four balanced feeds. One fed the rear channels, the other the front channels. A purpose built ATC summer and level control was used to derive the centre front channel.

The SCA2 preamps drove 100m of balanced audio cable to the front monitors, and no measurable intrusion of video or supply related noise or interference was detected during the presentation.

ATC WAS APPROACHED by promotions company, The Park Lane Group, to provide the monitor quality loudspeaker installation for the Queen Elizabeth Hall presentation. The sound had to fill the 900-seat auditorium (net 850 with the addition of the video projector located in the rear five rows), and do justice to the 4-track HDTV master.

Since, ATC was unable to undertake the D1 master until the first day of the Easter QEH screening, some prior monitoring was undertaken using the Teldec Laserdisc release. The programme dynamic range was measured as a little greater than 60dB with a noise floor 85dB below peak. These figures corresponded closely to the 4-channel D1 audio feed actually provided for the HDTV presentation.

ATC designed its system installation to achieve 110dB from the front channels, allowing significant headroom. Concert peaks during performance were maintained at 100dB maximum, though levels in excess of 115dB were achievable in practice. Ambient noise in the centre seats was in the order of 60dB, requiring a small amount of gain riding to mask noise from the Hughes-JVC video projector during the quietest passages.

For the performance, ATC generated one extra audio channel—centre front—in order to hold a central image for the stage soloists. Gremlins struck shortly before the curtain rose. The three phase mains of the QEH, which turned out to have a +10V variation, was bound to be a problem and, sure enough, hum breakthrough surfaced in the centre front channel.

REPLAY SOUND

As ATC's Alan Ainslie pointed out, 'You can imagine that -80dB from 10V is perfectly audible'.

Some rapid adjustments established a phantom centre channel for the duration of Das Rheingold, the first opera of Wagner's tetralogy. This was achieved mainly by reducing front stereo channel separation. Rear channel information was set at a discreet level in order not to distract attention from the stage.

During the long interval between Das Rheingold and Die Walküre, ATC engineers managed to break the earth loop reducing hum level to inaudibility by removing the mains earth to the offending channel. This enabled a return to the originally planned speaker configuration. For the left-right front channels, there were four pairs of ATC SCM 200 speakers, each pair providing 1700W of amplification plus 2dB headroom. The dual bass drivers were aligned vertically as were the mid-treble units. Two SCM 100 speakers, also aligned vertically, reproduced the centre channel. For the rear channel, a single SCM 50 was positioned each side of the auditorium facing the audience. The entire loudspeaker array was operated actively, with

www.americanradiohistory.com
format of downtown editing suites seeking the highest broadcast quality.) Unitel supplied real-time copy masters taken from first generation D1 masters. The 4:1 data reduction of D1 is achieved by removing adjacent static frame data, making it an efficient storage format for the enormously high density HDTV signal. A 4-track digital-audio signal was interleaved with the video information on the D1 tapes, several of which were required to store the entire three days’ of The Ring.

D1 tape is Unitel’s final mastering format for the finished HDTV programme. As such it clearly demonstrates the company’s mastering strategy for Teldec’s release of The Ring in today’s three main consumer formats, VHS, Laserdisc and CD. The best way to appreciate the significance of D1 in Unitel’s mastering programme is to trace our way through the recording and processing chain.

**UNITEL’S TONMEISTER.** Gernot Westhäuser, was at the cutting edge. He outlines how the recordings were made:

- ‘We used a 48-track Sony 3348 DASH recorder with a 6-desk combination of Yamaha DMC1000s. I placed microphones all over the stage, either concealing them from the three HDTV cameras focused on the stage for each scene, or deliberately placing them out of shot. There were a lot of difficulties, but I have been recording at Bayreuth for 18 years. We had a general rehearsal with piano accompaniment and two run-throughs for the recording. The director organised the singers’ positions during rehearsals, marking them on the stage, so the microphones could then be positioned appropriately.

- ‘It was difficult to change the microphones after the rehearsals. And, of course, no postproduction dubbing was possible—everything you hear and see was recorded on the Bayreuth stage to get the most faithful sound and picture possible. The rehearsals were inevitably full of interruptions—it was important to ensure that corrections were included in the final recorded performance. If a microphone was in the wrong place you would be lost. Then it would be very difficult if singers moved from the place marked on the stage they would be in the wrong position for the microphones.

- ‘I could talk for three hours about how I recorded and mixed The Ring. We used a wide range of mics including PZMs on the floor, under tables and so on. Some mic feeds required equalisation or reverb to obtain the best balance between stage and orchestra. Essentially we directed our efforts to producing one final audio mix, and my top priority was to make sure the CD sounded as good as possible. The same mix was used for mastering the CD, Laserdisc and VHS video.

As Peter Schröder, Studio Supervisor at Unitel, explained, for the CD, Laserdisc and VHS releases only the final, mixed down, edited front stereo 2-track master was used. This derived from a mixture of stage and orchestral microphone feeds.

However, an additional 2-track stereo master taken from hall mics recorded the Bayreuth ambience. Both the 2-track from stereo master and the 2-track rear stereo (ambience) masters were transferred from DASH to U-matic 1630 format. It’s these four audio tracks that are interleaved with the HDTV video signal on Unitel’s D1 master. Herr Engelbrecht, Head of Audio Production for Teldec, was present for some of the mixdown and editing because he wanted to confirm that the individual singers’ voices would sound right on all the release formats as well as for the HDTV production. He is amazed at Herr Westhäuser’s achievement, considering the restrictions imposed by the video recording:

- ‘The microphones out in the hall were there to record ambience in case HDTV or any other new format required surround sound. In 1991–92 we had to make an educated guess. It is always important to allow for arrival of future release formats. So then it is not a problem to release to the highest quality.’

‘From the outset we were always trying to focus on the best way to get the sound acceptable for both CD and VHS. For video voices need to be recorded close, but for CD such a balance would place voices too close. In the end we found that by recording the orchestra and stage action ‘live’ (minus only the audience) it was actually impossible to make voices sound too close. It wasn’t possible because the microphones were placed far from the singers.

‘In fact the mics had to be positioned E8’
Microphones for your professional sound made in Germany

Condenser Studio Microphone M 900

with cardioid polar pattern

Large diameter ceramic capsule
Transformerless circuit
Sensitivity 17 mV / Pa
Equivalent loudness level 13 dB - A
Preattenuation 10 dB
Reduced bass roll-off 10 dB / 90 Hz

with hypercardioid polar pattern

M 910

KONDENSATORMIKROFONE
FUR STUDIO- UND MESSTECHNIK

MICROTECH GEFELL GMBH

Mühlberg 18 07926 Gefell Tel. (036649) 262 Fax (036649) 280

However, Untel decided not to try to compensate for this compression by taking artistic risks and making tweaks to the VHS audio signal during postproduction.

For the Laserdisc release in different territories subtitles were produced in four languages. But instead of embedding the subtitles in the picture, they were placed in the Videotext band. You call up the appropriate page on a Videotext television, and the subtitles appear. This is true of both the NTSC and PAL NTSC releases. (One unfortunate side effect of this Videotext substitution was that for the QEH presentation they could not have the complete, 2-track mixdown done with the help of a rough mixdown made on DAT shortly after the recording of each act. Rough mixes were produced for video and audio using the automatic mixing console.

After the first edit, Westhäuser made special corrections for Barenboim—so first there was the basic edit and then the final, special, 2-track edit.

"I got the result I wanted—I am happy with the sound for compact disc. Perhaps for video the voices could seem too far away. If I’d been responsible for the video maybe I’d have said to Herr Westhäuser, “We want a second mix” but I’m sure he would have said: “No, it's not allowed, because the mics are where they have to be for the best sound on CD.”

Although the U-matic master used for CD, Laserdisc and VHS was identical, some loss of dynamic range was bound to occur in the high-speed duplication of VHS tapes.

COPYING

SCANNERS, the prestige facilities house, was called upon to handle Untel's copy master D1 tapes for the QEH screening. Its main OB van with banks of D1 tape machines onboard fed signal to a Bit Rate Reducer and D-A converters, outputting a separate component video signal to the Hughes-JVC 435 projector and analogue audio to the ATC audio preamp located inside the hall.

One hiccup five minutes before the First Act of Das Rheingold resulted in an unavoidable break in audio and video continuity halfway through first opera. A power supply failure put one of the D1 machines out of action, requiring manual transfer from Tape 1 to Tape 2. Apart from this technical hitch and one or two signs of tape drop out in the form of pixelation, there were no indications of serious difficulty during the presentation, though I did detect a momentary light intensity problem at one point during Die Walküre.

Mark Holdaway of Anna Valley pointed out that the 35-metre throw asked of the high-definition Hughes-JVC projector left little room for manoeuvre when setting up for contrast. Too much adjustment one way and the picture would look crushed—too dark, with inadequate tonal gradation. Too far the other way and everything would seem bleached. The sequence in Die Walküre must have contained an extremely high intensity image which stretched these limits.

Contrast was one of a number of set-up parameters for which Holdaway grappled with. His main task initially was to conduct a survey to calculate the most appropriate use of the screen for the scale of the auditorium. The switchable 6:1, 4:3, 3:1, 5:1 lens options on the projector gave him plenty of flexibility. But, he agreed, the final choices amounted as they often are, to a case of chicken and egg.

Was there any tape to tape variability? Holdaway wouldn't be drawn, simply explaining that normally on a show he wouldn't resort to any sound adjustments after the show. The fact is that in situations like this QEH presentation the projector operator is entirely at the mercy of the supplier.
Catch the Wave!
The AIR wave from nightpro™.

"If I think it sounds great, that's one thing, but when the artist notices the difference, that really tells you something. I use NTI's equipment because it is good for my craft and what I do."

Dave Reitzas,
Grammy Award winning sound engineer

Artists Include
Celene Dion, Madonna, Michael Bolton, Michael Jackson, Whitney Houston, etc.

The $EQ^3$ and the $PreQ^3$ are the only $AirBand_{tm}$ equalizer and microphone preamp available.

"The $EQ^3$ and the $PreQ^3$ are my audio signature."

Bob Whitley,
Audio Director, NBC Tonight Show

Don’t wait to hear what they can do for you!

Ask about our 30 day cash-back guarantee.

For more information contact us at: Night Technologies International, 1680 W 820 N, Provo, UT, USA - (801) 375-9288 - FAX (801) 375-9286
Or check us out on the Web at: Http://www.broadcast.harris.com/nti/
RECORDING

ATC SCA2 control preamps at The Ring premier

UNITEL and Teldec have not yet made a firm commitment to release The Ring on DVD. They believe the decision is premature since the technical standards for DVD have not been finalised. Clearly DVD should be the logical format to make the most of the surround-sound audio and high-definition video recording. Horant Hohlfeld, Executive Producer of the recording, certainly anticipates release of the Unitel Teldec recording of The Ring on DVD: ‘We have to be covered for any system that comes up, as we were with our 35mm recordings of Karajan, Bernstein and Kleiber’.

Schröder goes even further: ‘We have been preparing and discussing. We’ve made a few tests with Dolby Surround. And we have the four audio tracks of the HDTV master. So if a 5.1 channel sound track is required we would need to remix. To date, though, we have not experimented with Musicam’.

THE EXECUTIVE in charge of Teldec’s video releases, Marcos Klorman, admits to being frustrated by the current lost leader status of The Ring recording. Subtitling for the LD release alone cost between £10,000 and £12,000 (UK), enough to make any accountant blanche given the latest CD, VHS and LD sales figures. Even so, Klorman is eying DVD with cautious enthusiasm. ‘The fact that the recording is in component video certainly helps,’ he says. But he’s well aware of what he calls ‘the marketing botch-up’ that has plagued PAL Laserdisc. And he doesn’t underestimate the three hurdles DVD still has to clear—regional codes, copyright and sound coding. Once these issues have been settled, Teldec is more likely to commit to a DVD release for The Ring.

DVD could provide the ideal platform to promote Unitel-Teldec’s The Ring. Whether it will is in the lap of the gods. Enter Loge, Wotan and Brünhilde!

CONTACT

ATC, Loudspeaker Technology Ltd,
Gypsy Lane, Aston Down, Stroud,
Gloucestershire GL6 8HR, UK.
Tel: +44 1285 760561.
Fax: +44 1285 760683.

Labelling CD's in 3 Easy Moves

Kit Includes:

LABEL DESIGN TEMPLATE (PC & MAC)
THE NEATO LABELLER
COMPLETE INSTRUCTION GUIDE
ORDER NOW AND GET 99 FREE LABELS

THE £55 SOLUTION

MicroPatent Ealing House
33 Hanger Lane London W5 3HJ
FAX: (0181) 932 0480
SEE US AT: http://www.neato.com

www.americanradiohistory.com
WorldNet™ audio codecs and peripherals are the proven and effective solution to the worldwide acquisition and distribution of full bandwidth stereo audio over direct dial digital circuits such as ISDN or Switched 56.

**DSM 100 Digital Audio Transceiver** - uniquely provides the combination of high quality coding, low coding delay and error immunity essential to the professional audio community.

**Pro-Link ISDN Manager** - incorporates a direct dial-up adaptor and maintains maximum transmission security at all times - for both audio and other high speed data requirements.

**DRT 128 Digital Reporter Terminal** - delivers high quality stereo audio from remote locations. Lightweight, rugged and portable, the DRT 128 is the ideal solution for the mobile reporter.

**MCE 800** - the elegant solution to the distribution of multi-channel audio over T1 and E1 digital circuits. Up to eight simultaneous channels available.

**MCD 800** - for point to multipoint distribution the decoder incorporates demultiplexing for up to eight simultaneous full bandwidth audio channels.

**RMC 240** - using the embedded data facility on all APT codecs, the RMC 240 provides complete remote control over all DAT functions.

**APF**

Audio Processing Technology

Headquarters Tel: +44 0 1232 371110
Japan Tel: +81 3 3520 1020
United States Tel: +1 213 463 2963
As it is with visual effects, so it is with sound: each landmark motion-picture production raises the stakes for all that follow it.

MEL LAMBERT reports on the challenge faced by Steven Spielberg's sound crew when designing the sound for Twister

THEY DON'T COME any more action-packed than Twister. Directed by Dutch-born Jan De Bont—fresh from his action hit, Speed—the new movie features a screenplay by best-selling novelist Michael Crichton and is set amid the tornado-plagued plains of Oklahoma during a destructive series of storms. Twister follows two rival teams of scientists as they chase the largest storm to hit the state in more than 50 years—each wants to be the first to launch its own equipment pack into the heart of a twister to obtain valuable scientific data.

'I wanted to make this movie look as realistic as possible, and to film in the countryside where tornadoes take place,' says Director De Bont, who also served as Director of Photography on Die Hard and The Hunt for Red October. 'My goal was for the audience to get the feeling that they are one of those storm chasers out searching for a tornado.' Using a combination of live action, models and computer-generated sequences from Industrial Light & Magic, De Bont was able to produce several different types of twisters. 'But then we needed to create a 'colour' for each of them; some were scary, others magical, and so on.'

'Sound is very important to any movie,' the director explains. 'But, given the nature of what we are trying to achieve—including retaining a high sense of anticipation from the largely unseen threat that these phenomena can create—we needed to create "voices" for each of the different types of tornadoes featured in the film. Yet a tornado—which is our star—has no voice. I turned to Stephen Flick to create those impressionistic voices, and make them attention grabbing for the audience. At the same time, I wanted the audience to be aware that tornadoes have a "soul" rather than being inanimate objects.

'While working on location in Oklahoma, De Bont continues, 'I began to develop a series of ideas for how each of these might sound; when would you hear it, and when would you not hear it? How would it sound from a distance, and how would it sound close up? What would it sound like to be surrounded by a twister? We spoke to people that had real-world experience of tornadoes, about the sights and sound they had become a part of, and also viewed documentary and news footage. We wanted to create a life for each twister that would let the audience know what it was like to be involved in the power and beauty of such energy. People told us that a tornado sounded like 21 freight trains coming at them; we knew that we had to reproduce a lot of low-frequency rumble in the theatre, as well as the power of the wind—which was described as more like a jet-engine blast. I knew that coming up with a realistic and convincing sound-track was going to a major challenge to Stephen's creativity.

'Sound is becoming more and more important in movies; I even edited the film with sound in mind, by extending scenes to take into account what might need to follow. But Steve is one of the best sound-effects editors that I know; our experience on Speed convinced me of that, as well as his work with Paul Verhoeven on RoboCop and Total Recall.'

'We used the film's trailer [produced during the fall of 1995 in, unusually, 6-track DTS-SR-D formats plus 8-track SDDS] to introduce the character of the tornado to audiences. Stephen was very involved in preparing those trailers, and making sure that we had great sound effects.

'We convinced Rob Freeman, Head of Distribution at Warner Bros, that we needed a powerful, discrete mix for the trailers. We needed to sell the movie ahead of time—there are a number of important films being released in May, and we wanted to make sure that movie audiences, through a series of sound-heavy trailers, were fully informed about Twister.'

Flick—who served as Supervising Sound Editor on Trespass—recently set up a new base for his sound-design, editing and related talents in Glendale, California. Known as Creative Café, the new editorial shop features a wide range of workstations, including 25 Digidesign Pro Tools systems. Some of the Pro Tools workstations feature QuickTime digital picture, and are used with a variety of sound-processing software and hardware. 'The majority of our Pro Tools [v3.2] provide a total of 16 voices, mixed out to eight channels,' Flick says. 'A few systems offer fewer voices, which makes them perfect for use by assistant editors, and as inloading stations. 'We also have four [Avdel] AudioVision workstations, all with digital picture. We
recently acquired and are currently installing an Avid Media Share network system, which will allow us to simultaneously use over 200GB of sound files between several systems. One advantage of using Avid and Digidesign systems, Flick stresses, is that they can share a common file format, which means that material can be transferred easily from one platform to another.

All of the audio materials used in the film, aside from original production recordings, were recorded and edited digitally. 'All the sound effects were edited on our Pro Tools systems, while Foley materials were cut on Avid AudioVision. We recorded 50% of the Foley to DA-88, and the remainder with a Fairlight MFX3.' Mark Mancina's score was edited by Zig Gron at Media Ventures on Pro Tools. Mancina also wrote the score for Speed.

'To capture a variety of wind sounds, Flick contracted Field Recordist Ken Johnson to design and build a special device—christened 'The Professor Marvel Incredible Wind Machine'—that could be mounted in the bed of a pickup truck. Comprising a sturdy frame lined with foam and carpet padding to deaden the truck vibrations, various sound-making slats, wires and other devices could be added to produce different noises as they were pulled through the air. Johnson used a pair of crossed X-Y Schoeps CMC4 microphones with windsocks.

Then, while driving the pickup around various locations throughout the Mojave Desert, the field recordist could capture different sounds as the breeze made a variety of fishing lines, wires and other filaments create exotic wind 'whirs' and similar open containers mounted at various heights above the box frame were also used to create resonant sounds, plus slats and arms that could be extended to either side of the pickup body to produce whirring.'
POST PRODUCTION

Another of Ken Johnson's wind devices have the natural, low-frequency rumble just like a pulsing freight train, we experience a lot of LF information, followed by high-end steam pulses, followed by a fast pasby and then silence after the thing moves off. One of our editors had actually been in a tornado, which he describes as being first quiet and then incredibly loud.

So we began looking for effects that would contribute to the sound of our tornadoes -- there are several different twisters in the film, all of which have a different characteristic and sound signature, building to the film's climax. Martin Lopez and his crew of field recordists, including Charles Maynes, made a number of audiophile recordings for me of freight trains, pasby effects and other effects I would need for the movie. Last summer, Ken Johnson and Eric Potter spent several weeks recording wind effects here in LA and in Texas, as well as gathering more train effects.

'Many of these sounds, including a series of ambiance recordings, were made using multi-mic arrays, so that we could prepare 3-D images for the soundtrack. From our discrete recording [made to ADAT and DA-88] and sound design, we were able to produce 6-track masters for the soundtrack; I wanted to provide left-to-right information, as well as back-to-front, so that the sound could be placed anywhere in the auditorium. We were also able to re-create a sense of height--that the wind was above the audience -- by using matrixed effects and digital reverbs. I kept returning to the question: 'What does a tornado really sound like?' Or, more to that point, how should I make it sound to convince the audience that this is major threat; to provide a sense of power within the movie theatre? I concluded that the sound of a tornado is made up of three primary elements: We combined the sound of wind moving very fast, with objects being moved rapidly, and a voice panning across the surface of the wind--the combination is almost human in its characterisation, and can be varied by altering the speed and force of the wind velocity. We also added sounds we created on the Foley Stage, and totally synthetic sounds. These, in combination with surround-sound information, produced what I consider to be a very realistic effect on the dubbing stage, and one that will totally convince the audience that they are experiencing the real thing.'

FOR THE DUBBING of Twister, the sound crew moved to Universal 3, which features an 120-input Otari Premier board with DiskMix VCA/moving-fader automation. Because of the large number of sound elements involved during the prebucks and re-recording session, a sidecar Orian Concept board was added to the right-hand side of the main 6-track Premier console, and used to handle additional effects elements. Lead mixer for the dub was Steve Maslow, with Gregg Landaker handling effects, and Kevin O'Connell supervising music tracks, as well as a small overflow of effects elements. Maslow and Landaker worked together at Universal for many years, on such landmark films as Waterworld, Speed, and JFK. (During their previous experience at Skywalker Sound and Warner-Hollywood, the duo worked together on Top Gun, Empire Strikes Back, Raiders of the Lost Ark among others) O'Connell normally works at Sony Pictures Studios, Culver City, but has seen action with the duo on such films as Unforgiven Entry and Beetlejuice.

According to Steve Maslow, 'This is an effects-driven movie that opens with a big tornado. It's actually a flashback for a little girl that experiences the most horrific thing she's ever seen; then you dive into the future and the girl has become a storm chaser. But you don't really see the tornado because it's a night shot, instead, it's the presence, the sound, the destruction going on around them.'

'They came to the prebucks with hundreds and hundreds of raw elements--winds, debris. We worked mostly with stereo tracks that we placed and swirled around the room for the 6-track discrete mix that we then poured into DTS, SR-D and SDDS, as well as the Dolby Stereo mix.'

The final dub was to 6-track 35mm mag. 'We like the 'feel' of the [6-track] mix. O'Connell confides 'We didn't prepare extra tracks for the left-inner and right-inner channels on the SDDS mix, we just bled some information into the inner pair. Maslow recalls that the prebucking process was particularly complex because of the large number of sound elements. Steve Flick provided us with maybe 200-400 tracks for a tornado reel [on DA-88 and Pro Tools], and gave us his general idea of what he would like us to do with them. Then all three of us went to work with the material.' Music was supplied on a 16-channel Pro Tools system, prebuckled to 35mm mag.

'We didn't want to have everything playing at once, so we were diving in and out of different tracks', Maslow continues. 'As the twister got closer we would get the EFZ

70 Studio Sound

June 96

www.americanradiohistory.com
Scaling New Heights in UHF Radio

From the leaders in radio microphone technology come two new world beating designs. System 1081 Handheld and System 1083 Beltpack. True diversity, 16 channel switchable UHF radio systems that quite simply redefine the cost of professional wireless.

And that's not all. Maintaining Sennheiser's 50 year commitment to quality and performance these systems truly represent a breakthrough for radio. And that's going to make a lot of people very ecstatic.

Call us now for a copy of our brochure.

Sennheiser UK Ltd, FREEPOST, High Wycombe, Bucks HP12 36R. Tel 01494 551551, Fax 01494 551550.

www.americanradiohistory.com
"As the wind in the high-end, then get the low-end going and try to drive the tornado close to us. We would try to put specifics into the swirling effects and raspiness, because if you have 400-odd tracks playing all at one time it would sound like a big mess; we tried to give some definition to the sound. For me, predubbing is like editing; you only want to retain the sounds you know you're going to need for the dub.

For some of the premises, the film was still lacking opticals from ILM. 'Jan would stand close to the screen with a flashlight,' O'Connell remembers, 'and tell us where the tornado was and how it might move. We made mental notes of his movements so we could have those elements ready. Ninety percent of the time we hit them on the button; once in a while we didn't, and just fixed it on the final.'

During the final dubbing sequence, Maslow and his team had as many as 200 sound elements running through the main and sidecar consoles. 'Greg had about 110 on the main and outboard effects boards. Kevin had about 30 [music tracks], and I had about 30 or so [dialogues]. We probably started with close to 800 elements during the predubs.'

In terms of using sound to create a mood to reinforce what's happening on the screen, Maslow says that he considered a variety of techniques. 'There are a couple of scenes in the movie where a tornado is coming and we're just getting licks of wind whips, and maybe a little growl here and there. All of sudden all the people are looking around the screen because they know something's coming and then we hit them with it.'

In terms of discrete vs matrix mixes, Maslow suggests that six separate tracks enable him to more accurately define the direction of each sound. Also separate left and right surrounds enable the sound to move more freely within the auditorium. 'This movie definitely lends itself to a discrete format. A lot of times the surrounds become a little intrusive. But when you're into this massive tornado the SPL is up there; you feel like you're in the middle of this incredible monster. Surrounds can be overused. Hopefully, we used them to the right degree in this movie, because when you're in the vortex of this tornado you've got to have every speaker in the place going.'

'We treat everything with reverb and ambience when we predub it; sometimes if it's not treated enough we might hit it again! The mixing crew had access to three Lexicon 480 XL digital effects systems, which were 'very flexible, quick and easy to work with.'

'But Steve Fick is a genius for bringing to the stage pre-terminated tracks with 90% of the effects done for us; he brings us what he feels will work,' O'Connell says. 'He may have a dry version and a wet version so that we can mix between the two—when you're dealing with 400 tracks, for us to treat every single track would be very time consuming.'

'There's something a little different about Twister,' Maslow confides. 'Jan designed this movie around the score and the effects, so that they will not fight each other. By leaving spaces in the frequency spectrum, we have room to add sounds without swamping the level. An example: We're coming up on a tornado, and as soon as it is upon us, the music dies down and goes away completely. As soon as we get into the crux of this tornado, it's all effects.

'Because Mark Mancina and Steve collaborated on editing the score with the sound effects, it all bends together seamlessly. Mark wrote the score without diving into this frequency range where the effects were going to be—that's one of the best designs about Twister. For practically every chase I've seen—from Raiders of the Lost Ark to Top Gun to Crimson Tide to Waterworld—music is always fighting the effects, in this movie they compliment one other.'

In terms of dialogue balance versus music and effects, Maslow says: 'Basically, we just set the dialogue at a comfortable level and worked everything else around it. Obviously, as the action ebbs and flows, some pieces of dialogue are lost and we'll go up and retweak them.'

'Steve picked the level of dialogue,' O'Connell recalls, 'and so Greg and I mixed the effects and all music around it, so that the overall sound level of the movie doesn't become offensive.'

According to Maslow, 'The effects elements came in on DA-88, which is a choice that Steve Fick made because it's very flexible. But, for us, it's very time consuming, because we like to mix as we are backing up as much as we mix forward. We have maybe 20 DA-88 machines in the machine room and other areas. But when you've got so many tracks going at once, all of the DA-88s don't lock up to time code at the same time. So you're waiting for those missing eight or 16 tracks. We drive the whole system from a Timeline Lynx generator.

'We predubbed the film down to probably 30 tracks.'
Let us convert you

24 bit capable A/D and D/A converters
Unique dCS 5 bit 64 times oversampling technology
Sampling frequencies up to 96kHz
Nagra D interface for 24 bit, 96kHz recording and playback
Very low Differential Non Linearity
High stability clocks
Remote operation facility

Data Conversion Systems Limited
PO Box 250, Cambridge, CB4 4AZ, England
Telephone: +44 (0) 1223 423299
Fax: +44 (0) 1223 423281
Email: dcs950@dcsLtd.co.uk

setting the tone

"The Weiss 102 is an essential ingredient to Gateway Mastering Studios success. I don't know what I would do without it. From the Grammy award winning Sting album to the grunge of Nirvana and Pearl Jam, the 102 is my most used piece of gear."

Bob Ludwig
Gateway Mastering Studios, Inc.

Pop open a Studio Six-Pack
from Audio Technica

Studio Six-pack
Quick Application Guide

<table>
<thead>
<tr>
<th>ATM10a</th>
<th>ATM31a</th>
<th>ATM33a</th>
<th>ATM25</th>
</tr>
</thead>
<tbody>
<tr>
<td>Solo Vocals</td>
<td>Group Vocals</td>
<td>Overhead Cymbals</td>
<td>Hi-Hat</td>
</tr>
<tr>
<td>Snare</td>
<td>Tom</td>
<td>Kick Drum</td>
<td>Misc Percussion</td>
</tr>
<tr>
<td>Acoustic Guitar</td>
<td>Horns</td>
<td>Sitar</td>
<td>Strings</td>
</tr>
</tbody>
</table>

Special package offer on three Artist Series microphones:
- 2x ATM10a, 2x ATM31a and 2x ATM33a studio condenser microphones
- Plus a free ATM25 dynamic instrument mic
- All in a free protective 8-mic carrying case

SEw us at Audio '96 Stand 101

Studio Six-pack - the ultimate digital audio processing system.
6 Please send detailed information to:

Company: ____________________________ Name: ____________________________
Address: ____________________________ Country: ____________________________
Audio-Technica Information Centre, 6-10 Guyen Van Cu St., 10000 Hanoi, Vietnam
Tel: +84 4 8564052 Fax: +84 4 8564050

Royal London Industrial Estate,
Old Lane, Leeds LS11 8AG
Tel: 0113 277 1441 Fax: 0113 270 4836
www.americanradiohistory.com
"I thought that the best part about this movie is that we're trying to provide the feeling that a tornado has come upon the audience, and they are now experiencing what it is like to have tractors and semi's and houses and everything dropping in on them. And animals blowing around about their head. From something we saw on TV of people that had been in real tornadoes, the movie is a pretty good representation of how a real tornado sounds and the effect it can have on you!"

Gregg Landaker, "Each tornado is different in having its own character, there's are two that you don't see, and those that you do see. The last portion of the movie deals with F5 tornadoes on the F-Scale or Fujita-Pearson Tornado Intensity Scale, with 300mph-plus winds--The Finger of God, it takes out anything in its path."

"To capture the energy force of that coming out of a speaker system was one of our more difficult tasks. We have the sound of hundreds of freight trains going by at the same time, but we need to hear dialogue! To pick our detail is a very tough process. The art is to choose the right moment when you can take this mass of energy down a little bit for the other layers to come through. It's a difficult task, because, unlike other movies, this energy force goes on for a long period of time, unlike a gun shot, car crash or a train wreck that happens and then it's over."

And we needed to take the sound of a tractor hitting the ground and flying past us in the speaker system. Even though the audience is seeing a two-dimensional image in the screen, we're trying to create a three-dimensional sound coming through the room."

'On one scene, we had a high shot of a truck going through a ditch. You don't see the tornado but you hear it coming. The actors are saying, 'We've got to get out of here'. We put this very animalistic growl in the surround speakers that gives you a chill. So, when the tornado does reveal itself, there's another growl and it explodes a barn as they're trying to get away from it."

'Yet the audience has no idea of what's coming. I can either scare them, or try to get them away from the screen, you are manipulating your audience as much as the director manipulates the story. That's the art of a film mix, knowing when to make the audience feel like they're part of this event, and when to back off and let them listen to the story and get into the characters."

'There's a comedy part and a love story in Twister. And, like Speed, there's a happy ending to it all. So the audience will walk away going, 'Unbelievable, that was great' with a heartfelt story at the end of it."

"Kyma (kee-mah) runs on your Macintosh or Windows PC and combines: disk tracks & samples, real time processing & effects, with synthesis & composition, all generated in real time on a box full of DSPs attached to your computer."

A few minutes with a Kyma System, and you'll be certain that the future has arrived. - Dennis Miller, Electronic Musician


For a free brochure, contact:
Symbolic Sound Corporation
Post Office Box 2930
Champaign, IL 61825 • USA
Tel: +1-217-355-0773
Fax: +1-217-355-0662
info@kyma@SymbolicSound.com

June 96

Interior of one of several hundred sound-design and editorial suits at Creative Cafe, equipped with Digidesign ProTools and Avid audio workstations.

Supervising Sound Editor Stephen Flick, in the entrance lobby to Creative Cafe.
The BM15 is a new direction for nearfield monitors, one which will set standards for years to come.

It took 15 years, 100 Danes, a few million Kroner and an Englishman with attitude to come up with the BM15. Fortunately it was all worthwhile! We wanted to make a monitor which not only reproduced sound balances accurately but also enabled anyone to hear the difference between good and bad sources.

Many low to mid priced systems simply do not reveal the subtle distortions and resonance's which creep into a multitrack recording because they are hidden by the coloration of the speaker itself.

So how do we do it?
Dynaudio Acoustics has produced monitor systems for some of the world's finest studios and they have used the same uncompromising engineering standards in the BM15. High volume cabinet production and the automation of component manufacture has produced massive cost reductions without compromising quality at all.

In fact the BM15 could sell for twice the price, but don't worry, that's a job for our competitors.

So what's so different?
Well for a start there is a 210mm bass driver with a 100mm diameter voice coil. That's the same size as you will find in most 400mm (15in) drivers so the driving force is much greater and the power handling can be as much as 1000W!

Then there's the tweeter. The Esotec is normally found in systems costing up to four times more and its dynamics and transparency are truly stunning.

The crossover is built by our own engineers using only the best capacitors and high conductivity coils. We even correct impedance out to 50kHz (Rupert Neve would approve).

The End Result?
A monitor which is a clear winner in its field, tested by world class engineers and producers, one of who mixed a Number 1, million seller with the prototypes!

If you want to hear the way ahead check it out soon.

Dynaudio Acoustics, Unit 21, Riverside Workshops, 28 Park Street, London SE1 9EQ, UK
Tel: +44 (0)171 403 3808 Fax: +44 (0)171 403 0957 Compuserve: 100072,2302

www.americanradiohistory.com
**Digital wonderland**

Of the technological ages, digital is making its mark. But it extends back into the past as well as forward to the future writes **KEVIN HILTON**

The digits! The digits! They made me mad, you know. Digital technology is permeating our lives; it's there in the form of our CD collections (unless you happen to be a vinyl rebel), our telephone networks (although I happen to live in an area with one of the last analogue exchanges in the UK), computers and watches (sorry, they're an anachronism from the late 1970s). In becoming this pervasive, it has expanded the language.

At the end of the 1980s, some friends and I used to play a game that was called What Did We Do Before...? which involved coming up with things now a firm part of modern life that hadn't been around when we were younger—the favourites were fax machines and night buses. This mind-expanding game, which is only relatively less trivial than the one where players have to think of cartoon cats, dogs or rabbits, can be modified to consider how we regarded things before the word digital became a prefix to so many things. Poor old analogue never got the same exposure, at least not before the mighty digit came along. In the days before digital people didn't talk about 'analogue records', they were just 'records'. We do talk about analogue recordings now but only to differentiate them from the digital variety, which is a preservation action by the old guard. (A colleague asked recently whether there are really differences between the two. Before the letters pour in rest assured I snorted in a derisive way to answer this.) This makes me wonder whether, eventually, we will only identify something that is still in the analogue domain and not bother labelling a digital device or source because it will then be the norm.

In many ways, we can do that now. Do we really have to say 'digital audio workstation' given that there was never really an analogue audio workstation (unless you count tape machines hooked up to a mixer)?

When the EU Action Plan for widescreen television came into being, broadcasters and manufacturers agreed that there was little point in talking about PALplus because it wouldn't mean all that much, which wasn't a superior attitude, merely a pragmatic one that concentrated on the practical benefits of different aspect ratios, rather than talking about the tweaky bits behind them. Digital television and radio services will mean an upheaval for the consumer, not just the providers. To justify this the prefix digital is very important because it implies a new age, one where every viewer and listener is guaranteed what BBC Director-General John Birt has called 'a digital dividend'. When the BBC announced full details of its DTT services on 9th May, Birt, whom the late, lamented TV dramatist Dennis Potter accurately described as a grey man with a voice like a Dalek, gushed: 'In an increasingly commercial world, public service broadcasting will become even more important in maintaining a balanced broadcasting system. We forecast that every household will be a major consumer of BBC services in the Digital Age; the BBC will still be watched and heard more than any other single broadcaster in the UK.'

**THE DIGITAL AGE?** Good grief! This conjures up a picture of archaologists of the future going around digging up sections of Greater London looking for remains of Analogue Man (and Woman), primitive creatures with legs who had to wiggle strange objects called aerials to get decent reception on the few meagre channels available to them. Analysing Birt's statement makes me feel that he and his senior executives see the word digital merely as a marketing device, one that they hope will sustain the Corporation in its contest with the new generation of commercial broadcasters, both terrestrial and satellite.

Although the Beeb has a long list of the extra benefits that digital technology will bring to the viewer and listener, it appears that it is still using the 'D' word merely as a marketing jingle rather than focusing primarily on the extra services themselves.

For radio, the BBC has now confirmed the extra services that it hinted at during its less than impressive launch last September. These are: BBC Now, ten minute updates of news, business, sport, weather and travel; 5 Live News Plus, which will broadcast extra live news when the network is concentrating on sport; 5 Live Sports Plus, giving more coverage of more events; BBC Parliament; BBC Music Plus, offering genre specific services (jazz, country and so on); and Classic Comedy and Drama.

On the TV side, BBCs 1 and 2 will have wide-screen visuals and CD-quality audio, a number of so-called side channels, which will give wider choice and access to archive material or complementary programming (for example, a documentary on Irish novelist Roddy Doyle being 'shadowed' by a screening of the film version of his *The Snapper*); a 24-hour news channel, The Learning Zone educational service; regional broadcasting, a number of pay services covering documentaries, drama,

**We do talk about analogue recordings now, but only to differentiate them from digital**—a preservation action by the old guard

music, education and sport; and overseas services, including the BBC World Services. This will be accompanied by a multimedia division, offering a range of CD-ROMs and an internet service.

Through these examples it can be seen that digital is offering the consumer wide choices and access to things that could only be dreamed of in the analogue-only days. But these benefits are the main point, not the digits, which are only the means to an end. People criticise those heavily into computers and the Internet for being technology-obsessed geeks but those who feel that a sentence is incomplete without at least two mentions of the word digital are just as bad. Mind you, what else can you expect from a Dalek?
The new WMS 300 from AKG is a 16 channel switchable and highly flexible UHF radio microphone system that delivers spectacular price benefits.

Providing ten different configurations in one affordable system, no other UHF radio mic system can match its flexibility.

There's a choice of handheld or belt-pack transmitters and capsules for vocal, instrumental or lavalier systems. Three interchangeable dynamic and condenser heads are available to suit any type of vocalist or speaker – allowing the microphone to be matched perfectly to every show.

It's switchable to 16 spot frequencies within a UHF TV channel, with the ability to run up to eight systems simultaneously without Intermodulation.

A total system solution that includes antenna splitters and boosters and a receiver that can be run on either AC or DC voltage.

Other exceptional features include up to 12 hours' battery life from three AA cells (7 hours with rechargeables), a compact 1U true diversity receiver unit and, of course, AKG's precision audio quality, rugged durability and backup as standard.

Based on the well-proven WMS 900 system (tours include Peter Gabriel, Rod Stewart, Wet Wet Wet and 1996's Simply Red dates), the WMS 300 delivers a total solution at an exceptional price.

FOR FLEXIBLE UHF PERFORMANCE, THREE HEADS ARE BETTER THAN ONE.

FOR FLEXIBLE UHF PERFORMANCE, THREE HEADS ARE BETTER THAN ONE.

WMS 300 FEATURES

- SR 300 RECEIVER: Switchable to 16 UHF frequencies for multichannel capability • Half 19" rack width
- True diversity operation • Removable antennas
- PT 300 HANDHELD TRANSMITTER: Interchangeable microphone heads • Highly efficient helix antenna for wide range • Extremely rugged construction • Special capsule suspension minimising handling noise
- PT 300 BODY-PACK: Accepts dynamic and condenser microphones • Mic, mute or line selector for guitar, sax or lavalier options • Locking microphone input • Exceptional operating time

FROM £869.00 WITH - HARMAN ASSURANCE - PREMIUM QUALITY - FULL TECHNICAL SUPPORT - RELIABLE SERVICE

H A Harman International Company

www.americanradiohistory.com
If our marketing department had been as talented as our engineers, you'd probably be using a Prisma workstation right now.

**The alternative workstation.**

Okay, granted, there are already a lot of digital audio workstations out there. Some are so expensive that you can only afford one for six editors. Some are a little more than PC sound cards that can't lock to picture without timecode drift. Some are so complicated that after you've bought a Mac®, 5 add-in boards, a bus expansion box and 12 pieces of software, it almost nearly works most of the time.

That's why you should explore our radically different approach. Admittedly, we're guilty of spending far more time perfecting our products than advertising them. But today, a growing number of major post production facilities and recording studios are reaping the benefits of our meticulous engineering. They also rave about our great service and quick support available worldwide via internet, fax, or phone without having to wait on hold for hours.

**One hardware platform; three software solutions.**

Prisma® is our one-card hardware platform that frees up your CPU by handling all processing and signal flow on board. Its DSP capabilities are so massive that plug-ins aren't even an issue. Invest in Prisma hardware and then choose the Windows®-based software package that fits your applications and budget. Each has an elegant, hands-on interface that's free from frustrating pull-down menus, and floating window clutter.

**Express™ for Prisma™**

Express™ presents a simple, 2-panel interface with all the tools you need on-screen — instead of hidden in a mass of annoying pull-down menus. Perfect for broadcast, commercial production, multimedia and small home studios.

8 tracks - Over 250 markers & 99 Aute Locate points
- 10-level Undo/Redo - Fade automation
- Directly-draggable fades & cross-fades - Easy head & tail trim - Fast bi-polar waveform views
- Snap anything to markers, current position or other sounds - Compatible with & upgradable to Producer™ - Networkable

Express™ is a creative tool for broadcast and commercial production with no-frills interface so simple to use that even a program director could learn it. It uses Producer's hot-key shortcuts to reduce the learning curve if you upgrade.

**Producer™** takes the software recording studio paradigm to a new level. Its studio-friendly look and feel removes the impediments to creativity found in many current workstations.

**StudioTracks™ XP** has the tools you need for serious, heavyweight film and video post production, sound design, dialog editing and Foley work. XP stands for Cross Platform: StudioTracks runs on both Prisma and Spectral's even-more-powerful AudioEngine™ hardware, too.

**Get the whole, hitherto untold Spectral workstation story.**

Prisma™, Express™, Producer™ and StudioTracks™ are just part of our product line. They all come from an established company that specializes in digital audio workstation and connectivity solutions. Call, fax or e-mail for complete, detailed information on our practical approach to enhanced productivity.

We've been keeping it a secret for far too long.

*The software program Formerly Known As Prisma Music. Our previous Marketing Department did it.*

---

**STUDIOTRACKS’ XP**

Spectral’s advanced, cross-platform solution for film & video dialog editing, sound design and other edit intensive workstation applications.

- 256 virtual tracks - 12 tracks w/2 sends & returns
- Internal track bouncing - Rate-Conform - Direct VITC lock - Drag & drop SFX & dialog clips from library to project - Spectrum analysis - Flexible dynamics processing - Silence-stripping - Envelope editing - 2 EQs per channel - Digital patchbay - Trivial play list for mix-to-gro or mastering - Machine control - Networkable

“Runs on Spectral’s Prisma™ & AudioEngine™ hardware**

**PRODUCER™ for PRISMA™**

Radically different from any other workstation software, Producer™ is a “virtual studio” with direct access to familiar audio tracking and modulation tools including an automated mixer. Free from drop-down menus and nested windows, Producer's direct interface boosts productivity and creativity.

- 99 virtual tracks, each w/4 layers - 8/16/24" or more tracks - 4 sends & returns + 3 remix tracks
- Rich DSP features - 30Undo levels
- Automated fades, pans, mutes, aux sends - 2 EQs per mixer channel - Default cross-fades & butt-splines or custom via built-in editor - Markers
- Snap anything to anything - 3 waveform views incl. fast bi-polar waveform display - Grid can be set to bars/beats/frame etc - Direct VITC lock
- Can add timecode burn-in to video - Networkable

“via linked CPUs

**SPECTRAL A Euphonix Company**

http://www.spectralinc.com info@spectralinc.com
Tel: 1 206-487-3391 Fax: 1 206-487-3431
The European Office: Berkhamsted House
121 High St., Berkhamsted, Hertfordshire HP4 2DI, England
Tel: 44 1442 870 103 Fax: 44 1442 870 146

---

**Express™**

Express™ presents a simple, 2-panel interface with all the tools you need on-screen — instead of hidden in a mass of annoying pull-down menus. Perfect for broadcast, commercial production, multimedia and small home studios.

- 8 tracks - Over 250 markers & 99 Aute Locate points
- 10-level Undo/Redo - Fade automation
- Directly-draggable fades & cross-fades - Easy head & tail trim - Fast bi-polar waveform views
- Snap anything to markers, current position or other sounds - Compatible with & upgradable to Producer™ - Networkable

---

**Get the whole, hitherto untold Spectral workstation story.**

Prisma™, Express™, Producer™ and StudioTracks™ are just part of our product line. They all come from an established company that specializes in digital audio workstation and connectivity solutions. Call, fax or e-mail for complete, detailed information on our practical approach to enhanced productivity.

We've been keeping it a secret for far too long.

*The software program Formerly Known As Prisma Music. Our previous Marketing Department did it.*

---

**STUDIOTRACKS’ XP**

Spectral’s advanced, cross-platform solution for film & video dialog editing, sound design and other edit intensive workstation applications.

- 256 virtual tracks - 12 tracks w/2 sends & returns
- Internal track bouncing - Rate-Conform - Direct VITC lock - Drag & drop SFX & dialog clips from library to project - Spectrum analysis - Flexible dynamics processing - Silence-stripping - Envelope editing - 2 EQs per channel - Digital patchbay - Trivial play list for mix-to-gro or mastering - Machine control - Networkable

“Runs on Spectral’s Prisma™ & AudioEngine™ hardware**

**PRODUCER™ for PRISMA™**

Radically different from any other workstation software, Producer™ is a “virtual studio” with direct access to familiar audio tracking and modulation tools including an automated mixer. Free from drop-down menus and nested windows, Producer's direct interface boosts productivity and creativity.

- 99 virtual tracks, each w/4 layers - 8/16/24" or more tracks - 4 sends & returns + 3 remix tracks
- Rich DSP features - 30Undo levels
- Automated fades, pans, mutes, aux sends - 2 EQs per mixer channel - Default cross-fades & butt-splines or custom via built-in editor - Markers
- Snap anything to anything - 3 waveform views incl. fast bi-polar waveform display - Grid can be set to bars/beats/frame etc - Direct VITC lock
- Can add timecode burn-in to video - Networkable

“via linked CPUs

**SPECTRAL A Euphonix Company**

http://www.spectralinc.com info@spectralinc.com
Tel: 1 206-487-3391 Fax: 1 206-487-3431
The European Office: Berkhamsted House
121 High St., Berkhamsted, Hertfordshire HP4 2DI, England
Tel: 44 1442 870 103 Fax: 44 1442 870 146
Opening DAWs

Digital audio workstations have seen more than their share of success and failure over the last decade. **YASMIN HASHMI** offers an overview of current nonlinear systems and their standing in the market.

**WITH TAPELESS PRODUCTS** having been around for over a decade now, and with tens of thousands of systems already in place worldwide, the technology could be said to have come of age. For many, the primary benefits are nondestructive editing and digital-audio quality, but the overall move towards digital is driven by commercial considerations as much as subjective preferences in audio quality.

In an increasingly competitive and global market, there is pressure to get things done faster, improve the quality of the final product, or save money where possible, and digital technology is allowing this to happen for a broad range of applications. Manufacturers are also under the same commercial pressures, and whether providing recording, editing or replay devices, the pro-audio world is being irresistibly drawn into the digital age, and random access is now becoming the norm.

Even those companies not traditionally associated with recording editing products directly are also involving themselves in the technology by means of takeovers and strategic alliances. Mixing console manufacturer Euphonix, for example, has bought Spectral; and Fairlight is collaborating with console manufacturer Amek. In addition, Mark Crabtree has bought AIXS Neve back from Siemens, and OSC has been bought by Macromedia, makers of SoundEdit 16 Mac-based software.

A growing number of audio-editing-system manufacturers are joining with suppliers of video-editing systems—a trend highlighted by the acquisition of Digidesign by Avid Technology a couple of years ago. Now Sonic Solutions is cooperating with the digital video-effects specialist Discreet Logic; Studio Audio & Video is collaborating with both the nonlinear-video-system makers Adcom and the radio broadcast specialist Broadcast Electronics; and Avid Technologies—the company behind the Pyramix system—has formed an alliance with Softimage, makers of the video-based Digital Studio. Furthermore, some traditional manufacturers of audio products such as Publison, Doremi and FED, have expanded their respective portfolios to include video products, each having developed a digital disk recorder for picture.

The areas in which the technology has had the greatest impact so far are audio postproduction for video, CD mastering and live-assist and automation for radio, but the last 12 months have seen the introduction of more systems aimed at the music-recording market. For the low-budget studio in particular, there are now computer platforms on a consumer level, such as the Mac AVs, which have digital-audio capabilities thrown in. These platforms only require an appropriate software package in order to turn them into professional audio editing systems. Such packages include the new Digidesign Pro Tools DAE Powermix and v2.5 of Macromedia’s Deck II, both of which only require a 16-bit audio capable PowerMac, the number of channels supported depending on the clock speed, amount of RAM and disk throughput. For professional I-O, both systems can use Digidesign Audio Media or Pro Tools cards, and Deck II also supports the new Korg 1212 I-O card, which includes an ADAT interface and supports up to 32 channels.

Perhaps one of the most remarkable developments over the past year is the introduction of a new breed of low-cost recorder-mixers, complete with built-in disk drive, mixer surface and transport/edit controls, but also boasting professional audio quality. Such products include Fostex’ DMX-8 and Roland’s VS-880, both of which support 8-track operation and use hard disk as the recording medium. Using MiniDisc as an alternative are Tascam’s 564 Digital Portastudio and Yamaha’s MD4. Both support 4 tracks with punch in-out and include an integrated analogue mixer. The MD4 also supports the ability to submix all 4 tracks into one, while the 564 Digital Portastudio features a jog-data wheel and MIDI functionality.

For IBM-compatible-system users, a number of software-only packages are available which can use any Windows LE.

---

*Fairlight's FAME is poised to make serious inroads into the international postpro market*
NEW FROM DELTRON

Deltron’s new ¼” jack connectors introduce greater strength, reliability, ease of use, and - a first for musicians - a jack you can unplug in silence!

Malleable copper solid centre cores are stronger than brass. solder contacts riveted to the ground contact before assembling the centre pin are more reliable, and the double position cable-retention collet positively grips all size cables. And the black or nickel shells have grooves for colour coding rings.

And silent jacks? Yes, now you can change guitars without any buzz or hum! For the strongest, most reliable ¼” jacks - and those silent jacks - call now on +44 (0) 181-965 4222.

FOR 2-TRACK REPLACEMENT

Studer Professional Audio has launched the M-O-based D424 which can be used for a range of applications including CD premastering and integration with the Studer D741 CD-R machine. It supports linear recording as well as LRC, AC-2 and MPEG2 compression and up to 24-bit recording. The M-O-based GX2000 from Genex Research is primarily aimed at location recording and also supports up to 24-bit recording. In addition to linear recording, it supports what the company calls lossless data packing, the compression ratio varying with audio content. Tascam’s new MiniDisc-based MD-801R recorder/editor and MD-801P player-editor, support programmable, random-access, locate-and-repeat functions including an insert feature and a jog-data wheel that provides single-frame accuracy. The units support analogue and digital I-O and can be remotely controlled using a standard PC keyboard.

Along with the Direct Research Direct 115,

Omar’s RADAR was one of the first systems designed specifically for multitrack replacement. And until recently, virtually had a monopoly on the market with its cascadable 24-track unit. The past 12 months, however, have seen a marked increase in such systems, particularly modular 8-tracks, including the Fostex the D-80, the DAR OMR8 and the E-mu Systems Darwin. This supports an ADAT network such that Darwins and ADAT-compatible tape machines can be mixed in any combination up to 16 units. Optional hardware includes ADAT I-O, and ADAT sync card for full ADAT compatibility and SCSI host card for control by an external PC.

A more established system which uses 8-channel modules is the Soundscape SSDR1. This supports up to 16 units for 128-channel operation, and while the system can be used for simple multitrack replacement, it offers a comprehensive range of editing and mixing features for both music and postproduction for video. These include the ability to run simultaneously with any MIDI sequencer, a new DSP plug-in card for increased processing power, a number of new DSP software plug-ins, and the recently introduced EDL control feature supporting CMX, GVG and Sony format EDLs. SAV’s Octavia supports up to ten 24-channel modules and also includes comprehensive editing and mixing features, controlled using dedicated hardware surfaces.

Over the past few years, a number of attempts have been made by various manufacturers to integrate disk-based systems with custom-designed mixing consoles, but this has often resulted in a preview showing of the product with eventual withdrawal for further development. However, successful launches of optional mixer surfaces include the Fostex DEM dynamically automated module for its Foundation 2000, the MTR for the Akai DR8, DR16 and DD1500, the AIX automated mixer for Dorem’s Dawn II, a new hardware controller for the SADIE and Octavia systems, and the SCS-1000 controller for Sonic Solutions’ Sonic System. In addition, manufacturers which include mixers as an integral part of their systems include DAR with SoundStation Gold; Studer Editech with Post:Trio; SSL with Scenaria; Korg with SoundLink; Orban with the DE7200; and Fairlight with its new EAME. This system includes all the functions of the MXF3 along with a...
Introducing the coolest upgrade path in all of digital audio.

Pro Tools® digital audio software is already the overwhelming choice of professionals. Here's one more reason to use it: Now Pro Tools comes in a wide range of products, starting at the amazingly low price of £599 (Ex VAT). With each upgrade, you'll actually build upon the value of your system. So you're not just making CDs and sound tracks. You're making a sound investment, too. For free Pro Tools product information, just call 0800 898331.

Pro Tools® now available for PCI-based Macintosh Systems

The ultimate workstation. It accommodates a wide variety of realtime Plug-ins, 16-48 tracks of record/playback, 8-64 channels of high-quality analog and digital I/O.

Pro Tools Project™
All the capabilities of PowerMix and Audiomedia II or III, plus 8 tracks of simultaneous record/playback, and 8 channels of analog and digital I/O.

Pro Tools with Audiomedia II™ or Audiomedia III™
Get 2 channels of high-quality analog and digital I/O, as well as entry to an entire family of DSP Plug-Ins. Audiomedia III is designed to work with PCI-based Power Macintosh computers.

Pro Tools Software with DAE PowerMix™
An amazing value that turns your Power Macintosh into a multitrack digital workstation, with no additional hardware.

Pro Tools PCI Preferred Dealers:
Audio Engineering, Dublin 03351 6717600
Digital Village, Barnet 0181 440 3440
MediaSpec, Glasgow 013552 72500
Natural Audio, Herne 0181 207 1717
Syco, London 0171 625 6070
The Synthesizer Company, London 0171 358 3454

©1996 Digidesign, a division of Avid Technology, Inc. All features and specifications subject to change without notice. Audiomedia and Pro Tools are trademarks of Digidesign.
The THE surround ability of up to 30 journalists or editors features scalable architecture and for Solutions SonicStudio OnAir database and can append also preset supports specifically for control of any integrated with success—fully support control and automation send, dynamic moving-fader console with track-based recording.

Many disk-based systems are available for cart replacement, live-assist and full automation, but there are very few specifically aimed at radio production. The Orban DSE7000 is one such system, and supports specifically developed factory-preset DSP processes and effects. It now also supports file export to broadcast-delivery systems such as the Encod DAD486 and AES Electronics AudioVAULT, and can append the delivery system's database appropriately. The new Sonic Solutions SonicStudio OnAir is also designed for broadcast production applications and features scalable architecture and a range of options. Its networking capabilities include transfers at 4x faster than real time and the ability of up to 30 journalists or editors to edit on the same incoming feed while it is being recorded.

The FILM INDUSTRY is another market which until recently has not been well served by disk-based systems. Of course, there are a few systems with features specifically aimed at film applications, such as SAREVS SADIE (which has a special rush syncing feature), AMS Neve's Logic AudioFile combination and SN's OmniMix (both of which offer comprehensive surround-sound mixing). Timeline's DAW-80 StudioFrame (which has special ADR features) and the Studer Edilectric Dyas 11 and Post-Trio systems (which will soon support subtitling and dubbing tools). But the main drawback of disk-based systems for film has been the cost of storage and the number of channels supported. However, with the cost of storage dropping all the time, the past year has seen the emergence of a new breed of low-cost digital-audio recorder. Such systems are aimed at replacing multitrack and mag machines for recording and playback, but have the advantage of using removable media for transfer to proprietary editing systems.

The Timeline MMR-8 modular 8-track recorder, for example, uses plug and play M-O or hard disk and supports sync to time code or hiphase in forward or reverse, with jog-shuttle control and track slip. Fairlight's DAD dubber is designed as a playback-only device for material originally recorded using the MXF3. Available in 24-track modules and supporting real-time crossfades and EQ, up to 24 units can be controlled from one DAD control console. Akai's new D88 modular 8-track should be ready by the end of the year, and is designed as an M-O based plug-and-play replacement for the Tascam DA-88. It can play in sync, forward or reverse, at any speed, has dedicated track slip and event-region mute buttons and supports a range of sync and digital I-O options including an A/DAT interface.

While the tapeless audio market for video and TV postproduction can now be said to be mature, manufacturers are facing new technological issues raised not so much by the first-time buyer as by existing customers, who are looking to integrate with multiple systems, reduce bottlenecks and improve efficiency in terms of material management. One way of speeding up the postproduction process is by using random-access video recorders, since they require no waiting time for rewinding. Among the proprietary solutions is SSL's VisionTrack, the new Doremi V1 which can be used by Daw as well as any other 9-pin compatible system, Akai's DV1500, the

Orban's updated DSE 7000 with effects, was launched at the Las Vegas NAB show

82 Studio Sound

June 96
"While mixing a recent project I needed to get to the source tracks for some additional editing. Starting with only the back-up DAT's and having never used the Soundscape before, I rented the system and in only a few hours, with little instruction, was up and running, efficiently continuing my session with no down time. I was impressed with the Soundscape software and its features, I could even edit whilst simultaneously chasing timecode. The sound quality was great and when I asked the price, well... Very Impressive!!!”

Alan Howarth, Sound Designer, on such films as Halloween, Stargate, The Mask.

In this age of global communications good new travels fast... especially in this industry. Talk to any of our users (there are over 2000) and they'll all tell you the same thing. Soundscape SSHDR has the creative tools to improve productivity, the software is incredibly fast and reliable and saved them a great deal of time and money. This is why more and more of the worlds top professionals in sound design and motion picture editing are changing to Soundscape and the PC for their audio editing. From dialogue replacement and foley recording to that blockbuster movie soundtrack the SSHDR has some of the fastest and most powerful editing features available.

Is your existing Digital Audio editor expandable from 8 to 128 tracks, with real time editing while chasing time code and have fully parametric EQ? Does it give you 18 bit dynamic range and volume contours generated in real time, with professional I/O and audio quality uncompromised by noise from your computer. With glitchless audio scrubbing for accurate editing and perfect placement of sound effects. Soundscape offers all of this at a price much lower than you would expect.

If your serious about Video why not get serious about Audio and ring or fax Soundscape now....

Prices from only £2500 inc.VAT (8 track system)
large multimachine systems, with acquisition directly to, and live working directly from, disk irrespective of physical location.

The ideal would be a transparent transfer of material irrespective of the platform used, and while initiatives such as Open Media Framework Interchange (OMFI) are slowly being taken up by manufacturers, very few, if any, are using OMFI as a native format. Companies such as DAR and AMS have now had success in releasing lightworks audio files directly but an increasing number of manufacturers is turning to file conversion software in order to import and export a range of different file formats—Speak-on's systems for example, will do this over a network.

**WITH STORAGE CAPACITIES ever-increasing and costs decreasing, the range of tapeless applications is bound to expand. Increasing processing power will mean more real time functions, and the increased performance and availability of multimedia resources will allow more plug and-play solutions.** In addition, the convergence of technologies and applications will require even more integration of different material types—audio with text for news, audio with picture for video and film, audio with text, graphics and video for multimedia and the Internet. All of this will lead to the inevitable—more collaboration, alliances and takeovers, and more compatibility and as a result.

---

*Digital Audio Labs V8 card*
Producers, studios and artists are getting more attention than ever these days. Just listen to the soundtracks of Oscar winners Apollo 13 and Dead Man Walking and you'll hear incredible multitrack editing and mixing made possible only by Sonic.

Tune in to this year's Grammy-winning recordings to hear the superb sound quality delivered by Sonic Studio, the DAW that gives you the power to do your most exciting and creative work.

Sonic Studio delivers the performance and the quality you've been waiting for. Background loading, multitasking and high-speed networking turn your Sonic systems into a seamless media workgroup.

Spend your time creating—not waiting.

Get your hands on the industry's favorite digital workhorse. And while you may not have to worry too much about groupies, you can expect to get chased around.

By new business.

And Visit us at www.sonic.com.
**Digital audio workstation**

**Xtrack**

The Essential Tool for Post Production

**Xtrack for Windows:** simple and efficient

**Features**
- Real-time virtual editing
- Simultaneous record and playback on the same track
- Time-stretching
- Noise reduction
- Pitch shifting
- Equalization
- Mixing
- Direct CD-Audio access
- Sound library management (local or remote)
- Time code management in Master or Slave mode
- Control via an RS422 Interface
- Video insertion
- Video management on MO or hard disk
- Network operation
- Dedicated keyboard

Xtrack is user-friendly, flexible and increases productivity. Don't take our word for it, call us for more information.

**Parc de Pré Milliet**
38330 Montbonnot - France
Tel: (33) 76.52.47.47 - Fax: (33) 76.52.18.44

www.americanradiohistory.com
The 'new age' of nonlinear technology is still denied by a handful of analogue die-hards. But their defence of yesterday's technology is a diversion from a model that offers to define the future. Writes Chris Edwards

Nobody is about to dispute the elegance of analogue circuitry or its performance. Nobody is going to insist that the secrets of analogue recording media are still so obscure that digital technology is nothing but a blind alley and that the future is analogue. Yet there remains a hard core of analogue devotees who promote analogue over digital at every turn.

If we ease off a little and consider music's recent history, we can identify a model which may help us accommodate our move into digital technology. It's not so long ago that audio professionals openly derided the Musical Instrument Digital Interface, regarding it at best as a substandard medium for handling functions that were loosely analogous to those of professional musicians and pro-audio, and at worst as a travesty of all those skills they held dear.

Yet MIDI provided a generation of aspiring musicians and engineers with an insight into the power of nonlinear recording and editing that was unparalleled in pro-audio. While we were slowly coming to terms with the distinction between moving faders and Casio, MIDI musicians were learning the potential of nondestructive editing, edit decision lists, automated EQ and an alternative relationship between time and pitch.

Certainly, the demands of MIDI-literate musicians have helped define the functionality of today's professional consoles and their automation systems, and many of the operational principles employed in digital-audio workstations are identical to those pioneered in early MIDI sequencing software. Certainly, it is inescapable that, given the right sort of software tools, hard-disk recording can be used to achieve results in a fraction of the time that it takes with analogue tape, especially when you combine it with the new generation of 'soft' mixing desks now appearing on the market.

One problem not directly encountered by MIDI, however, is that hard-disk recorders work on the basis of 'audio tracks' that is not fully supported by audio replay technology. The 'track' is a metaphor that pro-audio engineers and producers (and even record company A&R people looking market) are used to. It also helps make the task of using a nonlinear system much less daunting. Sadly, many hard-disk recorders cannot guarantee to replay all tracks at once. Generally, there is not a problem with a dedicated 8-track system but once this modest track limit is exceeded, at least with current hard-disk technology, you run the risk of encountering track 'drop outs'—typically this is the case if the machine cannot access a particular segment of audio in the available time because it is on the other side of the disk.

This is something that will be progressively eliminated as computer memory becomes cheaper—in effect, at this point nonlinear recorders will come to behave more like samplers and use a lot of caching to reduce the probability of experiencing an audio drop-out.

At the same time, the track metaphor is probably also going to die out in this context because it does not reflect what the hard-disk recorder is able to do so much as reflecting our inability to operate it. The hard-disk recorder is, even now, a bulk sampler and playback engine. As a result, over time, the sequencing software used to control the machine will make you think more in terms of sample polyphony and less in simultaneous tracks. When you get a drop-out on a hard-disk recorder today, you can think of it as the equivalent of MIDI note stealing.

Once we are free of the dependency on track analogies, the 'soft' mixing desk, with its ability to direct one input a limitless number of ways, is going to prove extremely useful. With it you can feed any number of signal processes, give musicians any kind of monitor mix they want—from the mics on a particular type of amp and speaker to heavily treated DI feeds—and still manage to record any number of takes ranging from straightforward repeated performances through a variety of DI boxes to arrays of mics in front of speakers. Certainly, there are more recording and mixing options just around the corner than there are in any real-world studio—and certainly enough to give the producer the flexibility he may crave.

But perhaps the most important observation to make about the rise of the workstation is that of relating its history to the future. If many of today's workstation pilots are drawn from yesterday's MIDI enthusiast, then it follows that tomorrow's audio operators are going to demand the kind of user interface that are now being devised for video games, Net working and the emergent generation of interactive media. Forget the elitism of touch-screens for a moment, and consider the

Forget the elitism of touch-screens for a moment and consider the prospect of virtual-reality mixing

prospect of virtual reality mixing. Yes, it's as indefinable as it is unavailable but this will change. And those of us who derided MIDI in the 1980s may well be best placed to say 'I told you so' to the top-gun operators of today's state-of-the-art workstations when the crunch comes.

The fact is that so much of tomorrow's day-to-day technology is already being defined by ideas too radical to be entertained by 'serious' manufacturers' R&D departments. Instead, it is being explored by the forerunners to William Gibson's cyberpunks. And why shouldn't it not be so wasn't the music culture that imparted so much impetus (and cash) to advanced audio was borne of youth expression?
the time it took you to read the first word of this advertisement, the Tascam MD-801 could search, locate and play any track in over one hour of digital programme material.

The MD-801 is fast - with track search up to five times faster than any other MiniDisc player and programmable instant track replay. It can record, erase and edit works with consummate ease.

In fact, by the time you've read this far an MD-801 could have made all the difference.
IC op-amp testing

**Since IC OP-AMPS** were last considered in these pages, there have been more new, low-cost, and highly specified op-amp models released than the entirety of what existed before. Fortunately for designer and reviewer alike, the majority of these are very high speed, wideband parts, principally for video, which don’t display their benefits at audio frequencies, and at the generally low gains, below 20dB, required in most audio IC positions. At the same time, there has been a small but increasing stockpile of parts made expressly for audio. In this context, the biggest change has not been the so-called ‘current feedback’, but the complementary process, which has allowed IC designers to put decent pnp transistors in their chips. Listening today to mid-1970s recordings with some of the better modern op-amps reviewed here, the use of substandard ICs in 1970s recording consoles and tape machines is plainly audible. This has left the world with a legacy of bad sonics that may never be correctable.

Table 1 details the parts that have been chosen for primary examination. The majority have FET inputs, making them noisier than the classic NE5534, which would just make the VLN grade. A couple of AD types are principally designed for single-rail application, which is usually a major retrograde step for quality audio. A mic head-amp is one obvious exception. These types were tested in the same, dual-supply jig as all the other parts, proving that they are ‘upwards compatible’. A few are non conventional op-amps. One employs current feedback and is an up-to-date, if otherwise random example, of many such parts principally made for wideband analogue signal processing. Other devices under test (DUTs) are higher level integrations, namely two-balanced-line receivers (DTSEC), a transmitter, and a buffer (uninvy gain only, all having the 8-pin package in common.

**Primary Testing** was for linearity. With the modern parts tested here (the models marked > are older types believed to be ‘noncomplementary’), %THD would be well below 0.1% under all reasonable conditions. On this basis, the decision was taken to abandon the universe, but potentially meaningless or highly misleading %THD testing, as a means of categorising sonic quality. Instead, high-resolution harmonic spectral testing was performed. This was pioneered by the author in 1993.

The test takes place with a low distortion 1kHz stimulus, at 1V rms (+2.2dBu). This is the lowest distortion test condition for the AP test set used. Sixteen samples are averaged, to cancel out extraneous, random (stochastic) noise, and give a high (better than ±1dB or ‰% certainty to results that are as low as ±ppm. Fig.1 shows the test setup, which is a

![Diagram](image-url)

**Fig.1:** The test circuit for harmonic spectra. Most ICs operated were rated at or above ±18V and were tested with ±16V supplies. Those marked | | In Table 1 were limited to just ±6V, inadequate for most professional applications. The feedback network values mean that the real load on the DUT is just over 4kΩ, although the analyser load is 100kΩ. In the analyser’s 600Ω condition, the 124Ω output resistor helps to make the total load close to 600Ω. CMR was set at -40dB by a small but purposeful resistive imbalance, to deliver a small but well defined amount of common-mode voltage. For the two parts employing CFB, the HF comp cap is disconnected. The SSM 2017 true CFB can be plugged into the same bed by opening the feedback arm, and grounding pin 5, as shown. The BUF0-4 buffer has no-v input. It and the 2142 balanced-line driver version were tested by being driven unbalanced.
THE TINY CAN BE BIG ON THE AIRS

WHAT CAN BE the significance of these figures? Knowledge of masking derived with sterile steady-state tones would suggest that differences in harmonic content would yield harmonics that are as small as -120dB (one ppm) are utterly insignificant. Nothing could be further from the truth. Detractors with the results, at the sub -100dB level are quite readily discerned by skilled listeners on ordinary but good recordings, in conditions of real use, for example mixing, balancing. But if the wrong thing is being measured, the results are bound to be oblique. Nowadays, with the very macro and micro-motor parts of the cosmos neatly co-explanable with everyday reality by physicists with the Superstring theory, with its 13 dimensions of space, some of the stuff that people can hear that seems out of proportion may be legitimated by considering that electronic circuitry (unlike transducers) exhibits errors in higher dimensions that 3-dimensional tests sets are leaving a struggle to resolve. The late Richard Heyser anticipated this, and wrote some essays about it (thank you, Neil) and the late David Bohm's 'theory of everything'—implicate order, sister of the Superstring—explain neatly why it is possible for human senses to perceive effects that are almost too slight to measure in the available dimensions of measurement. Particularly audio, since Bohm wrote, 'in listening to music, one is... directly perceiving an implicate order.' A light analogy of trying to measure a higher dimension when the measuring equipment is limited to a lower dimension, occurs with some aliens who are investigating the contents of houses in London, but cannot read. One of them has a weighing machine that will detect differences of 0.000000001%. So they patiently weigh worthless books (and Studio Sounds) to try to learn about them, but find this usually gives a poor—if any—corroboration with the value within them, as expressed by the humans. But the alien has also noticed that no matter what measurements will sometimes give an almost linear measure of worth. This happens when the two books are in some way comparable—latter and earlier editions. Thos of us who have seen that later editions can be disproportionately improved by corrections and additions, having value in excess of the weight of ink they add, and the aliens might deduce this by noting an increase in weight of (say) 13 parts per billion.

The general significance of harmonics may now be briefly explained: see ref. 4 for a deeper treatment. The 2nd, 4th and 8th are innocuous in one sense, as they are 100% comparable (with respect to the Superstring). An introduction (with random phase) nonetheless retains the capacity to change the sound's timbre and pitch in ways that may be unpredicted, relative to behaviour on lower levels. The 3rd, 5th and 6th may be relatively innocuous in some combinations, but dissonant in others. The remaining harmonics are almost always highly dissonant, even in tiny quantities—unless you are attuned to Japanese music. The capacity of harmonics to compound into a morass of intermodulation products, yet there cannot be much of this in circuits with %THD well below 0.01%, just as few people would be living off compounding if interest rates dropped below 0.01%. Yet at levels that may be taken to be less than tiny quantities (below -90dB), I have witnessed experiments in which solely the effects of sprays of harmonics can be perceived more as dulling, loss of detail and loss of separation than as dissonant in the usual sense of 'antimelodic' or 'gritty'.

Fig.2 The TL2071, update of the famous but comparatively crude TL071 demonstrates fine behaviour typical of the modern genre of op-amps built with complementary transistors. The sloping line is the demarcation below which the AP's own residue may interfere with the DUT and the TL0207's second harmonic clearly dominates.

simple one op-amp balanced input stage, DTSEC or 'debalancer', with an 0dB in-out gain. Now the DUT experiences the higher, internal 'noise gain' of +6dB. This configuration—balanced in and 0dB through gain—was expressly chosen for best resolution, as the AP's output transistor is able to be used in balanced mode, for the lowest residual. The AP test set's own residue (APR) was logged before, during and after testing, and was at least 50dB below the -120dB demarcation, and generally 100dB-150dB lower with the higher harmonics.

The spectral tests were carried out with two nominal load conditions, 100kΩ and 600Ω. The latter 'low load' condition may not be met by many op-amps in practice but simulates the consequence of a higher gain setting, which would increase the residual baseline. Testing the 25 ICs together with APR checks produced 56 detailed graphs, with all data being made available separately, to avoid overstating their welcome in these pages (see references). Fig.2 offers an example, while the behaviour of all the parts (which had all spectra below -100dB) is reported here in summary. In each of the reports, the IC's name is first suffixed by '600' indicating the low-load condition, followed by 4k on the next line, indicating the approximate, effective load in the relatively unloaded condition including the feedback resistor. Next, the harmonics are listed in size order, largest first. The following code is then used for brevity: 2nd, 3rd and so on are harmonics of the kith zone; 'dominant' is that >100dB larger than all others. Low = all (unlisted) harmonics are below 120dB (1 ppm).

Spray — a prominent family of harmonics. A few parts, marked #, change dramatically from 'low' to a spray of harmonics when loaded with 600Ω. These types are evidently unsuited to high gain and/or heavily loaded conditions (line drivers, mic or mix amps). On the basis that the cleanest sounding devices will have residue that is either 'all low (') or else any harmonics above -120dB will be limited to the 2nd, the cleanest parts are: Category A, all harmonics below -120dB under both load conditions. AD817 LM833, OP176, OPA627, SSM2142, TLE2142. Category B, only 2nd harmonic above -120dB under both load conditions: HA2548, LT1360, OP275, OPA604 & 2604, SSM2141 & SSM217, TLE2071 & 2141.

THE CROSSTALK of a variety of dual and quad op-amps—as opposed to the circuitry they are in—was tested by conventional means, as shown for the first time in Fig.3. The single IC test position
IT'S ALL IN THE COMPANY WE KEEP

From Pink Floyd to Peter Gabriel; Depêche Mode to Duran Duran; Meat Loaf to Randy Travis; Eros Ramazzotti to Bryan Ferry; Simply Red to the artist formerly known as... more major artists tour with Turbosound Flashlight & Floodlight systems than any other turnkey sound system. These prestigious artists all rely on companies recognised as industry leaders in both service and sound quality.

Companies that understand the advantages offered by Turbosound’s exclusive designs: the finest available audio quality, labour efficiency and trucking economy of any system. Flashlight & Floodlight rigs are supplied as complete systems — including loudspeakers, digital system control, amplification, cabling and certified flying hardware — resulting in a coherent package with optimised system performance, industry-leading reliability and ease of transport. You owe it to your clients to offer them the finest sound reinforcement system available — You owe it to your company to offer them Flashlight & Floodlight.

Turbosound
Once Heard, Never Forgotten

H A Harman International Company

Turbosound Ltd. Star Road, Partridge Green, West Sussex RH13 8RY, England Tel: +44 (0) 1403 711447 Fax: +44 (0) 1403 710155

Turbosound wishes to thank the artists and Britannia Row Productions, Ltd, Eighth Day Sound Systems, Inc., Nuovo Service srl and BBI Inc.

Use of artist names does not imply product endorsement. Floodlight is manufactured under licence from Funktion One.
The new TUBE-TECH EQ 1A is a state of the art full range parametric equalizer. Featuring one channel of low and high cut, low and high shelving and three overlapping bands.

AUSTRIA (02) 236 26 127, BELGIUM (02) 41 5270, BRAZIL (011) 604 8339
DENMARK (43) 59 88 77, FINLAND (09) 592 055, FRANCE (16 87 74 80) 90
GERMANY (098) 609 3947, GREECE (011) 823 8200, HOLLAND (03) 402 5570, ITALY (09) 348 608, JAPAN (03) 3489 3201, KOREA (02) 741 7398
NORWAY (09) 951 975, PORTUGAL (1) 333 3331, RUSSIA (095) 955 1825
SINGAPORE 481 5508, SWEDEN (086) 32 03 70, SWITZERLAND (01) 840 0144, TAIWAN (886) 2719 2366, UK (01691) 655550, USA (212) 566 5089

LYDKRAFT DENMARK

Lydkraft Aps • Ved Damhussoen 38
DK 2720 Vanlose • DENMARK
Why do Studiospares invoices include the date and time?

So we can monitor our performance to ensure the best possible service.

All incoming orders are processed within minutes.

Whether you order 100 metres of multicore, a reel of 456 or an XLR plug, your order should reach you next working day on mainland UK or in 48 hours on mainland Europe.

<table>
<thead>
<tr>
<th>Quant</th>
<th>Part No.</th>
<th>Description</th>
<th>Weight</th>
<th>Unit Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>20</td>
<td>685-201</td>
<td>BANTAM PATCHCORD</td>
<td>2.16</td>
<td>£2.33</td>
</tr>
<tr>
<td>10</td>
<td>574-070</td>
<td>2U BACKTRAY</td>
<td>0.40</td>
<td>£4.77</td>
</tr>
<tr>
<td>5</td>
<td>401-211</td>
<td>456 1/4 in wire dia</td>
<td>17.80</td>
<td>£17.70</td>
</tr>
<tr>
<td></td>
<td>643-213</td>
<td>6 PAIR JACKETED</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Total Invoice: £499.25

No waiting, no fuss, just service with speed

Please send me a free copy of the Studiospares 100 page catalogue

Name ..................................................
Company (If relevant) ..................................
Address .............................................
Post Code ...........................................
SONIC IMPROVEMENT IN THE PAST DECADE

I HAVE ASSISTED a number of audio professionals in upgrading the ICs in their equipment. In 1983, I upgraded the main recording mixer belonging to Underworld. The industry standard, yet primitive NE5532, 5533 and TL072 op-amps in two input channels, two subgroups, and the stereo masters, were changed for enhanced singles and duals made by Harris Semiconductor. Underworld's Rick Hyde reports, 'Since the chip changes, the DAT's recording quality has gained in resolution. You can hear much more. There is far more air and space, and you can hear reverb tails go right down'. Their FON DJ mixer for live work has since been upgraded with OP275, and SSM 2017 and 2142.

Experimental Soundfield evaluated a lot of ICs before 're-chipping' their FOH console to create what is described in Brixton, London as 'the best dance sound system in the world'. Their experience is a warning that not all dimensions are being covered by any set of measurements. Specifically, one model which measures well (at 1kHz, as here) turns out to sound strangely wooden in the bass, and its otherwise fine sound hardened when driven hard. They liked the OP275, yet chose a model from Harris that measures less well. The interaction of op-amp sonics with the ancillary parts may explain some of the irregularities.

The three bear essentials

QUALITY
VERSATILITY
PRICE

OKTAVA MK219 The mix that started the 'Korum revolution' has got a large gold plated diaphragm and a sound that strikes models many times its price. Test/Review, classic coveros. £26.95-net

OKTAVA MK081 A modular microphone which comes complete with interchangeable capsules, a sound quality that matches up to the highest standards set by Western manufacturers and engineers, and at a price that wouldn't cover the VAT on similar sets. £20.00-net

OKTAVA MK811 The perfect general purpose mic, needed in more and extremely high in quality, this one is useful in all areas of studio work and great in live situations. Although it's a true condenser it costs less than most budget back elements and sounds infinitely superior. £40.95-net

NEVATON CMGS1 The latest return to the Russian forces, has a gold plated diaphragm and switchable patterns, is extremely accurate and has an incredibly low noise floor. The build quality alone would lead most to believe the mic was at least twice the price. £54.95-net

"You get a lot of mic for your money when you buy Oktava"

DISTRIBUTED BY
A & F McKay AUDIO LTD, TEL: 01483 208511 FAX: 01483 208538

significant that the author and other audio designers have not employed dual op-amps in their best-sounding designs.

THIS GENERATION of ICs are, for the most part, reasonably priced. In real terms, their prices, typically between £1 and £2 (UK) in manufacturing quantities, will be deemed too expensive by purely profit-line-driven manufacturing, even though in real terms, the price-performance ratio is extraordinarily good. Today, the amounts have almost flipped. The variety of op-amps is a healthy sign, but how exactly they can improve or change the sonic quality of a given unit or system is something that even the sophisticated measurements here cannot yet do more than hint at. As Germans say when gazing at an array of rye breads, 'Proberen...' or 'It is better to try it, than study it'.

References and Further Reading

A bound copy of all the measurements can be purchased from the author.

Fig.4: The test setup, as modified to test crosstalk in duals and quads. The tested ICs were mounted in a flying header with ch.2 cabling taken directly off the IC pinouts.

Fig.5: X-talk harmonic spectra of the Texas TLE 2142 differs from most in having a large 3rd alongside the 2nd harmonic, under the 60Hz condition. The test frequency is 50Hz, so the 2nd harmonic is the first and largest spike at 100Hz. Note also the distinct 5th, even in the lightly loaded condition.
...enough said?

RICHMOND FILM SERVICES

Tel: +44 (0)181 940 6077 Fax: +44 (0)181 948 8326

THE HIRE COMPANY
OTHER HIRE COMPANIES HIRE FROM!

NAGRA-D

Only £60 per day £240 per week

THE BEST NEED NOT BE EXPENSIVE!

The Heart:
nexus

The digital audio interconnect and routing system. Compact modular design that exceeds the most stringent quality and safety standards. Total control of all parameters from any point in the system via bidirectional fiber optic cable. With all established input and output formats. For demanding venues with rigorous performance requirements.

For example:
The Sender Freies Berlin

Valentinstraße 43 · D-96103 HALLSTADT
Phone +49 (0) 951-9 72 25-25 · Fax -32
Bahnhofstraße 13 · D-79843 LÖFFINGEN
Phone +49 (0) 76 54-70 71 · Fax -70 73
The Soundcraft DC2020
(Now available in 3D)

DC2020 SURROUND

Already making a name for itself in the world of post production, our DC2020 just gained a whole new dimension. Surround Sound.

Thanks to a brilliantly integrated version of the renowned Magtrax™ system, the DC2020 Surround provides fingertip control of up to 24 record/replay channels plus dedicated mix channel monitoring and metering.

Meanwhile, a compact external rack interface handles all additional audio connections without the need for re-patching.

And all this in addition to the moving fader automation, touchscreen driven machine control, video sync and on-board hard disk storage.

Discover more about the DC2020 and DC2020 Surround by calling +44(0)1707-668143 today.

HARMAN INTERNATIONAL INDUSTRIES LTD., CRANBORNE HOUSE, CRANBORNE INDUSTRIAL ESTATE, CRANBORNE RD., POTTERS BAR, HERTS, EN6 3PN, ENGLAND. TEL: +44 (0)1707 665000 FAX: +44 (0)1707 660482
Now hear this!

... And see the latest in: Broadcast, Post Production, Recording Studios, Project Studios & Performance Technology

Britain is recognised as one of the leaders of the pro audio world and to demonstrate this Audio96 will bring you the complete range of audio equipment - the largest to be seen in the UK.

Audio96 is a comprehensive exhibition incorporating a new and unique series of working demonstrations exploring five key themes:

- Broadcast
- Post-production
- Recording Studios
- Project Studios
- Performance Technology

Complementing the practical applications are a series of workshops and briefing sessions designed to keep you abreast of the changes in your industry.

Audio96 will bring you the technologies, the suppliers, the experts and the strategies to help you do your job better.

Audio96 welcomes international visitors from all disciplines of the industry and from the UK, home producers to broadcast professionals.

To find out more, fax us on 0181 940 1685.

Audio96 Technology & New Media
19-21 June 1996
Olympia London
Presented by APRS

For FREE tickets to Audio96 call 01734 312211
or post the coupon to:
Audio96
APRS Ltd
2 Windsor Square, Silver Street,
Reading
Berkshire RG1 2TH
United Kingdom
or Fax: +01734 756216

Name
Position
Company
Address
No. of Tickets
Tel
Email
Post code
Fax

www.americanradiohistory.com
TURN TO PAGE 100 FOR THE
STUDIO SOUND
PRODUCT AND BROCHURE SHOWCASE
FEATURING
THE LATEST PRO-AUDIO PRODUCTS.

AKG ........................................... 77
Alesis ....................................... 17
Amek ........................................ 43
AMS Neve .................................. 53
APT .......................................... 67
AS McKay .................................. 94
Audio '96 ................................... 98
Audio Precision ............................ 19
Audio Technica ............................. 73
BASF ......................................... 29
Beyerdynamic .............................. 54, 55
BPM Studiotechnik ........................ 14
Bruel + Kjaer ............................... 10
BSS Audio ................................... 30
Calrec ........................................ 26
Canford Audio .............................. 100
Danish Pro Audio ........................... 100
DCS ........................................... 73
Digidesign .................................... 81
Digigram ..................................... 86
Dynaudio Acoustics ........................ 75
Euphonix ..................................... 08C
Focal Proline ................................ 42
Focusrite ..................................... 45
Futters ...................................... 80
Future Film Development ............... 100
Fuzion ........................................ 9
Ghielmetti .................................... 101
Harbeth Acoustics ........................... 100
HMB ........................................... 25
JoeMeek Ltd .................................. 95
Lydkraft ...................................... 92
Mackie ....................................... 56, 57
Meyer .......................................... 11
Microtech Gefell ............................ 64
NTI ............................................. 65
Oram ......................................... 49
Otari .......................................... 39
PAG MK IV ................................... IBC
Penny + Giles ............................... 12
Preco ......................................... 100
Prism Media Products ..................... 100
Project Audio ................................ 30
Quantegy ..................................... 32
Richmond Film Services ................... 95
School of Audio Engineering ............ 8
SCV ............................................ 40
Sennheiser ................................... 71
Silver Productions ........................... 72
Sonic Solutions ............................. 84, 85
Sony ........................................... 23
Soundcraft ................................... 96
Soundscape ................................... 82, 83
Spectral ....................................... 78
SSL ............................................. 34, 35
Stagetec ....................................... 95
Studer ......................................... 37
Studiospares .................................. 93
Tannoy ....................................... IFC
TC Electronic ................................ 58, 59
Teac/Tascam ................................. 88
Tektronix ..................................... 100
Tickle Hire Music ............................ 100
TL Audio ..................................... 60, 61
Turbosound ................................... 91
Weiss Engineering .......................... 73

June 96

Advertisers Index
Anthony DeMaria Labs
These precision-built devices are made in the U.S.A. to 'all-tube' designs for those who want the best. Their well-earned reputation for quality and reliability is backed by an impressive list of owners and users on both sides of the Atlantic. Want to find out why?
Now available in the U.K.
For Sales, Service & Rental Call
tickle music hire ltd
0181 964 3399

Tektronix' Television Products Catalogue
Inside this invaluable product catalogue are full details of an ever-broadening range of monitoring, generating and measurement products from Tektronix - the leading supplier to the broadcast industry.
Tektronix' involvement in many international standards organisations means we are able to bring test solutions promptly to the world. Our record in addressing the video and audio industries test and monitoring needs is second to none.
Tel: +44 (0) 1628 403300
Fax: +44 (0) 1628 403301
TEKTRONIX
4th Avenue,
Grove Park, Marlow,
Bucks
SL7 1YD

Prism Sound produces the DSA-1 hand-held AES/EBU analyzer, the Dscope FFT analyzer and high-quality A/D and D/A converters.
The DSA-1 is the only hand-held tool that measures carrier parameters and data content. With programmable go/no-go limits and watching on Channel Check makes it solves interface problems fast.
For more information on Prism Sound range of products, call:
Tel: +44 (0) 1223 429498
Fax: +44 (0) 1223 429023
William James House, Croydon Road,
Cambridge CB4 4WX

THE PRECO EQUIPMENT GUIDE
27 glossy pages brimming with one of the most comprehensive ranges of broadcast and pro audio equipment available as well as the inclusion of a number of detailed descriptions of newer products at the forefront of innovation and technology.
Don't delay, get in touch with Preco for your full colour equipment guide.
PRECO (BROADCAST SYSTEMS) LTD
3 FOUR SEASONS CRESCENT
KIMPTON RD, SUTTON, SURREY
SM3 9DR
TEL: 0181-644 4447
FAX: 0181-644 0474

FUTURE FILM DEVELOPMENTS
The May '96 Future Film Developments (FFD) Product Guide is now available
FFD stock: Canare, Cannon, Supra, Switchcraft, Neutrik, Edac, Hirose, Middle Atlantic, beyerdynamic, Sennheiser, Ryco, Shure, Sony, ASL, Matthey & many more.
FFD offer a custom-cable and jackfield manufacturing service plus technical advice. We also buy and sell and part exchange used audio equipment through our sister company UFT.
Whatever your audio/video requirements, make sure you have a copy of the FFD Product Guide with its 6000+ items to hand!
44 Oxford Road
New Denham
Uxbridge UB9 4DN
Tel: 01895 813710
Fax: 01895 813701

FREE STUDIO AVAILABLE (HOME EDM)
- LOOK HOW MUCH RESPONSE CAN BE GENERATED BY A LITTLE BOX!
TO RESPOND TO ANY OF THE ADVERTISEMENTS APPEARING IN THIS FEATURE, OR TO BOOK YOUR SPACE IN STUDIO SOUND'S PRODUCT AND BROCHURE SHOWCASE FAXBACK REBECCA REEVES NOW

For an immediate response either FAXBACK Rebecca Reeves directly or mail to Studio Sound, Ludgate House, 245 Blackfriars Road, London SE1 9UR.

Circle the number you require further information about
1 2 3 4 5 6 7 8 9

YOUR INFORMATION
NAME
ADDRESS
POSTCODE
TEL
FAX

www.americanradiohistory.com
NEVE 8068. CONFIGURED 32/16/32 REMOTE PATCHBAY FITTED 32 x 31102's, 8 x 33264A, 24 METERBRIDGE.

NEVE 8058. CONFIGURED 28/16/24 REMOTE PATCHBAY (PRESENTLY UNDER FULL REFURBISHMENT) FITTED 24 x 1073's, 32404 AUX MODULES 32408 ROUTING MODULES.

NEVE 8058. (2 FRAMES) TO BE CONFIGURED AS FOLLOWS 56 FRAME FITTED 56 X 331102's, 8 x 33264A COMP LIMITERS 56 X 32431's, 56 x 32430's, REMOTE PATCHBAY.

NEVE 8036. CONFIGURED 24/8/16 R/PATCHBAY FITTED 24 x 1064's, GRP MODULES 1943/1's 4 REV RTNS 2 x 2254A COMP/LIMITERS, 16 METERBRIDGE.

NEVE 8036. CONFIGURED 24/8/24 R/PATCHBAY FITTED 24 x 1064's, GRP MODULES 1943/1's 4 x 2254E COMP/LIMITERS, 4 REV RTNS 24 METERBRIDGE.

NEVE 8036 CONFIGURED 24/8/24 PATCHBAY FITTED 24 x 1064's, GRP MODULES 1900's, 4 REV RTNS, 2 X NOISEGATES. 4 x 2254A COMP/LIMITERS, 24 METER BRIDGE.

NEVE 5114 CONFIGURED 36/14/2 REMOTE PATCHBAY FITTED 36 X 83049's, FOUR BAND EQ/DYNAMICS 4 AUX.

NEVE 5114 CONFIGURED 36/8/24 REMOTE PATCHBAY. FITTED 60 X 83049's, FOUR BAND EQ/DYNAMICS.

4 AUX SSL MODULES AVAILABLE. 611E SERIES MODULES 24 AVAILABLE.

NEVE 5305. CONFIGURED 36/8/2 REMOTE PATCHBAY FITTED 30 x 33114's (MORE AVAILABLE). 36 x 33752's. REMOTE PATCHBAY (SEPARATE 24 TRACK NEVE MONITOR BOARD AVAILABLE WITH IT).

NEVE MELBOURNE 12/2 FITTED 12 X 33114's.

NEVE BCM10 FRAME FITTED 10 X 1066's.

NEVE 12/8 SUB FRAME FITTED 12 X 33114's AND 12 X 33752's INBUILT LINE AMPS AND PATCHBAY.

NEVE 8/2 (THE SUITCASE CONSOLE) 2 IN STOCK EACH FITTED 8 X 34128's.

NEVE 5402B BROADCAST CONSOLES 2 IN STOCK. FITTED STEREO MODULES.

NEVE MODULES PRESENTLY IN STOCK.
NEVE 1064's/1081's/33114's/33115's.
NEVE COMPRESSOR LIMITERS 2254/2254A/2254E's.

LARGE STOCK OF NEVE SPARES: LARGE SELECTION OF SSL SPARES.
PRESENTLY WISHING TO PURCHASE NEVE/SSL CONSOLES PLEASE NOTE ALL STOCK IS OWNED BY AES PRO AUDIO.

---

**APPOINTMENTS**

---

**Dalet Digital Media Systems**

worldwide leader in digital audio systems for radio stations

is looking for

**Software Developer** Ref. S.O.Win
With at least two years of experience in Windows C/C++ Object programming, you are looking to integrate a highly qualified engineering team to develop complex applications related to audio. Knowledge of PC networks, Sybase or Oracle a plus.

**Product Managers** Ref. S.O.Mgr
Responsibilities: writing documentation, testing new versions, training and supporting customers on our software products for radio stations.
Requirements: English as a mother tongue, excellent writing skills, good technical knowledge of Windows and LANs, Working papers, experience in video, music or broadcasting industry a plus.

**European Sales Engineer** Ref. S.O.Euro
Responsibilities: answering to tenders, promoting and selling our software products directly to radio stations or through dealers.
Requirements: English as a mother tongue, excellent writing skills, Marketing degree or professional experience, knowledge of Windows and PC networks, Working papers, experience in video, music or broadcasting industry a plus.

All positions are based in Paris but require extensive travelling.

Please send resume to:
Tel: 33 1 40 38 01 39 Fax: 33 1 42 05 18 66

---

**Canon**

**Audio**

We specialise in the design and manufacture of innovative loudspeaker systems for professional and domestic markets worldwide. We have a vacancy for a

**LOUDSPEAKER DESIGN ENGINEER**

to work on a wide range of new products. We are looking for:

A good honours degree in physics, engineering or a related discipline.

A minimum of one year's experience in a design and manufacturing environment.

For more details, please contact Stewart Taylor on 01256 841300 or send your CV by July 31st to:
Denise Jones, Canon Audio Ltd., Gastons Wood, Reading Road, Basinstoke, Hampshire RG24 8TW.

---

---
EQUIPMENT FOR SALE

505-507 LIVERPOOL ROAD, LONDON N7 8NS
Tel: 44 (0) 171 609 5479
Fax: 44 (0) 171 609 5483

Mark Thompson
Helen Rider
Steve Lane
Clive Richards

RADISHES
Remain Irrelevant

But FUNKY JUNK have the UK’s largest stocks of used pro audio equipment BY FAR including:
Multitracks by Otari, Studer, Tascam, Soundtracks, Saturn, Desks by Neve, Soundtracks, Raindirk, Soundcraft, Tweed, Trident, Outboard by Lexicon, AMS, Yamaha, Drawmer, Urei and the rest MICS, SPARES, and NEW EQUIPMENT (Joemeek, Cranesong, Focusrite, TC, TLA, Genelec, MTK).

Prices exclude VAT (tax free for export)
All major credit cards accepted.
Overnight carriage at cost.

And as always... "If the tea don’t slay ya, the prices will"

The best prices
The best backup
The best service

Sound Control Professional Audio
Glasgow - 0141 204 2774 - 61 Jamaica Street
Newcastle - 0191 232 4175 - 10 Mosley Road
Manchester - 0161 877 6464 - Regent Road

For all your professional audio requirements
AKAI DD1500/DR16/DR8 - YAMAHA 02R - TASCAM DA88 - AMEK - CROWN - GENELEC
DYNAPRINT - DIGIDESIGN AUDIOMEDIA IIII/PROTOOL/SESSION 8 - TL AUDIO - LEXICON - FOCUSRITE

Studio Systems

Specialising in Soundtracks Consoles
The SOUNDTRACS range:
LARGE PRODUCTION CONSOLES
QUANTUM 32/32 (48-line) M.O. - Drawmer 500 or/and 8 A&V/TT Pillar
LEXICON 3606 & 8 FX RMX (Mirrored) 8 A&V/TT Pillar (version kit)
CMX 2/2/2/2/2 (500ms) digit with A&V/TT Pillar
CP 400/500/500 digital in CMX

PROJECT MII & PAGE
Megaphone 35/35/35/35
mid-mic mixer
MIDI PC 333/3 8 FX Kins (73-lines) mid-mic mixer
MIDN PC 360 (Multirack) mid-mic
SOLE 32 and Topaz
All consoles are serviced to full spec, guaranteed and will give years of music success!

Studio Systems

"THE HOME WHERE THE SOUNDTRACKS ROAM"!
We have sold over 1200 service experience with Soundtracks room, and carry virtually every spare part in stock. Call our service depot for any soundtracks questions. If you would like to sell YOUR SOUNDTRACKS then call, fax or drop into studios.

Tony Larking

WANTED

NEVE, SSL, STUDER, OTARI

The Digital Village

- Pro Tools - Drawmer - Lexicon - Akai -
- TLA - Eventide - Joe Meek - Avid -
- Tube Tech - Mackie - Neumann -
- Rode - AKG

Studio Equipment Wanted

MCI JH-556-D

VINTAGE 56 CH. MIXING DESK
Continually maintained

Fax 41 22 738 04 02

River

PRO-AUDIO

TEN: 0171-237 1424

THREE x SERIES 3
FAIRLIGHT CMI’s FOR SALE

STILL THE ULTIMATE SOUNDING SAMPLER
All serviced with warranty from only £6,500 + VAT
Tel. 0171-700-1852 Fax. 0171-607-1410
HORIZONTAL PRODUCTIONS
**EQUIPMENT FOR SALE**

Sounds Incorporated

nick ryan

call: 44 (0) 1892 861099
fax: 44 (0) 1892 863485

Re-selling Quality Recording Equipment to Studios throughout the World

**USED EQUIPMENT LIST**

**PHONE** +44 (0) 1225 447222 • **FAX** +44 (0) 1225 447333

**CONSOLES**

- **CONE XS-1 VS**
  - **AMT Virtual Console**: $250
  - **Ampex MXH 16**: $200
  - **AKAI 6 Channel**: $150
  - **Studer 880 12**: $100
  - **Focusrite**: $75

- **TEAC MTR 90 Mk II**: $400
  - **Studer 820**: $300
  - **Otari MTR 90 Mk II**: $200
  - **Studer 850**: $150

**DIGITAL RECORDERs**

- Sony D2400 with A- spring, $200
  - **Panasonic SV-6300**: $350
  - **AKG 426 stereo**
  - **RCA 77 DX**: $100
  - **Shure SM-58**: $50

**MICROWAVES**

- **Dynaudio**: $150
  - **Oktava**: $100
  - **Shure SM-58**: $50

**OUTBOARD**

- **New AM2000 stereo limit comp kit**: $1,800
  - **Neve 2152**: $795
  - **New Neve 8048**

**ANALOGUE TAPE MACHINES**

- **Granier MX 16**: $3,900
  - **AMT MXH 20**: $2,900
  - **Neve 8024**: $2,500

**U.S.A. PHONE (0) (01992) 863485**

**prices exclude VAT - E.S.O.E.**

This is only a selection of the equipment we have in stock. Call to receive our regular mail shots. Similar equipment wanted for cash. Part exchange welcome. Government & Educational orders welcome.
ONE OFF CD's £20.00 + VAT
Up to 74 Mins

500 CD Singles Complete £690 + VAT.
1000 CD Singles Complete £995 + VAT.
500 CD Albums Complete £820 + VAT.
1000 CD Albums Complete £1190 + VAT.

Sadie Digital Editing (over 3hrs storage), Editing To Score, Post Mastering, Artwork, PQ Encoding.

Phone C.R.S. 01424 436426

Make it with us ... Sound Recording TECHNOLOGY

- Compact Discs
- High End Mastering
- Latest 32-bit DSP
- Super Bit Mapping
- 20 Bit Digital Recording Studio
- 20 Bit Editing
- Sound Restoration, De-Click etc
- Copy Masters
- Digitally Duplicated Cassettes
- Print/Reprographics

Market Leaders
Tel: 0181 446 3216 London (Fax: 01490 461860 Cambridge)

THE TRACKSIDE SUITE
New Digital Editing/CD Mastering Suite Using Latest Sonic Solutions System
Over 13 Years Pro Audio Experience
5000 SQ Complex Digital/Analogue 24 Track Recording
Artwork Sleeve Design
All At Very Competitive Rates
Call Paul Page On 01702 333453

Paul Lennon Audio Services
Sadie digital post-pro New! Up to 17 hours hard disk storage New! Exabyte
The Post Production Service for your project at our premises or yours. Hire also available.
Tel: 0378 060646 or 0171 428 0381

Ground Bass Productions
Digital Mastering Suite
24 Bit Digital Editing
One-Off CD Duplication
Multi-Media Authoring
The Vardan Centre, Woodside Street, The Angel
London N1 R5
Tel: 0171 288 1853 Fax: 0171 288 1874

Real Recordings
The Cassette Duplication Specialists
Real time & high speed loop bin duplication, printing & packaging. Blanks wound to length.
Tel: 0161 973 1884 Fax: 0161 905 2171

DINEMEC Sound Mobile Studio
Classical to Rock
AMS/NeoVE Logic 2 Console
80 Channels/148 Inputs
Studio 48 Track (Dash)
Wide Selection of Microphones
Fully Air Conditioned
Based in Geneva, Switzerland
Tel: +41.22.349.2225 Fax: +41.22.349.8377
Internet: http://www.dinemek.com
PRESSiTM CD Labelling System
You’ve recorded your CD
Now make it look professional!
The quick, effective, safe way to print and apply circular labels to CD ROMS and audio CDs using laser and inkjet printers. PRESSiT™ comes complete with 100 white, 100mm circular labels, layout templates for Mac and PC and the PRESSiT™ label applicator.
Intracutary price: £79.95 + £5 shipping and handling + VAT
Additional labels: 100 white £10, 100 coloured £16, 100 clear plastic £25.
Order and order热线: 0500 026103
Cheques or Postal Orders to: Rocky Mountain Traders Ltd


CALL FOR DETAILS:
PHUTURE SOUNDS, Tradewinds House, 5 Albert Road, Crowthorne, Berks RG45 7LT. Tel: 01344 780008. Fax: 01344 762262

Lockwood Audio
HEAR BY MILLIONS BUT Seldom Seen
FREE COURSE
C-Ducer Studio Quality Contact Condenser Microphones

2 High Street, Haslemere
Burlingame, Kent ME7 0XJ, England
Tel: 01428 658775
Fax: 01428 658439

STOCK LABELS FOR COMPACT DISK VHS VIDEO & AUDIO CASSETTE

- On all sheets for computer printing by laser printer.
- As continuous roll with holes for dot-matrix printers.
- Supplied blank with white next day delivery from stock.
- 48 hour delivery on a wide range of coloured labels.
- Custom printed labels supplied to client specification.
- Telephone for overnight delivery of FREE samples.
- Unit 15, Church Road Business Centre
- Ealing, London W5 9SG, England
- 020 8753 4204 Fax: 020 8753 4250
- Tour site: http://www.tanymistudios.co.uk/tanyc

Accusound
CLOSE MICROPHONE SYSTEMS FOR ALL ACOUSTIC INSTRUMENTS
405-901-8755
1910 W. Florence Ave.
Riverside, CA 92505
Cincinnati, OH 45209
Dallas, TX 75226
Bass lines for Club Swing, Club Phillips, M.G.M. Records, Big Band, Nu-Soul Music, High Tri-Fidelity, Broadcasting, Accoustic Microphones, etc.
Tel/Fax: 410-545-1525

The Studio Wizard
We Design Supply Build Train Initial: Debug and save you money! So if you want a studio that works we are magical call me!
0860 666532

FOR ALL YOUR RECORDING NEEDS
APEX BASF MAXELL 3M SONY KAO
AUTHORISED NATIONAL DISTRIBUTOR
Spool, boxes, stands, soldering and lead tape
Custom-sound cartridges CI 100, hybrid, blanky, black, gift cards, bulk audio CDs, cases, pedal, broadcast components.

THE STUDIO HIRE

12017 - 431 - 0212
12017 - 431 - 0212
12017 - 431 - 0212

PROTOCOLS 3 NOW AVAILABLE FOR HIRE
ONLY £20 PER DAY, £100 PER WEEK.
DENON DP-9000 MINIDISC RECORDER (6).

MARK GRIFFIN FURNITURE
CUSTOM STUDIO FURNITURE

AIR CONDITIONING & VENTILATION TO SOUND STUDIOS IS OUR SPECIALITY
We provide design only or design and installation for many well known clients. Whether it be for displacement, free cooling, VAV, VRV, split, unitary or centralised call Mike Hardy of Ambthair Services Ltd on 01403 250306 or Fax 01403 211269

www.americanradiohistory.com
Many producers are becoming concerned about frequencies that escape their monitoring systems. **BEN DUNCAN** argues the case for checking the subsonic content in audio recordings.

**SOMewhere**, at the top and bottom of the frequency domain, useful audio ends. That's the easy bit, because beyond this simple observation, we can be sure that there will never be complete agreement on where these ends occur. Realistically, the definitions have to remain adaptive for a variety of reasons.

Firstly, humans differ physiologically. Straightforward subsonic sound below the usual threshold would seem—like ultrasonic sound once did, before EEG traces proved otherwise—to be, at best, only subliminally audible. Yet people can 'hear' below 20Hz, where the 'average' person's perception is bodily. The sleep-deprived sufferings of a Yugoslav woman who could hear down to 4Hz was reported recently by a respected audio engineer; elsewhere, a water pump was found to be preventing people from sleeping, even though they were some miles away and were not conscious of its sound or any vibration.

Secondly, humans have an immense adaptive range. Once you learn the knack of being receptive to 'subsonic' sound, the threshold of perception may be extended. In analogue electronics, of course, there are no clear limits to the audio spectrum because there are no brick wall high-pass filters in analogue electronics. There is even an argument that any high-pass filtering is unnatural, unlike its opposite number. There is general consensus that a gentle (or at least gently accelerating) low-end roll off is better than going low, then having to slope off abruptly at a high rate. But beyond this, high damping or settling, and the least frequency-dependent delay may have conflicting requirements. It is useful to be receptive to, and have tools to resolve, subsonic sound when recording, since a great deal of it is either nonmusical or troublesome. And you cannot predict what reproduction equipment is being used by the keenest domestic listener, let alone what will become available in the future.

Occasionally, almost random, large cone movements that persist for fractions of a second or more, before they abruptly disappear have been noticed in recordings being played back on high-end domestic transmission line speakers. In theory, all good cutting and mastering rooms should be watching a spectrum analyser like a hawk, to monitor for activity below 40Hz, and will excise any excess levels. In practice, it doesn't always happen. Subsonic sound in final mixes should be monitored before it reaches the cutting or mastering stage. LF EQ'ing may have brought up subsonics that were well below audibility at an earlier stage. Then surprisingly small increases in their level are needed to noticeably increase the intensity.

**MY SUGGESTION** requires a suitable, no-hassle switching or quick patching arrangement that moves the connections of a given pitch-shifting gizmo from where it usually is, to be on the output of any channel insert, directly after every mic amp, and thus before any steep high-pass filtering, and likewise on the output of any keyboards, samplers and down to 0Hz digital sources. A scanner switch would allow periodic checking to sweep automatically through the sources. Set the gizmo to a high or maximum pitch multiplication. With sub-20Hz frequencies shifted up to the low midrange (say) they will be much more audible, while most of the audio will be taken off into supersonic realms, where is should be brick-wall filtered out of existence. Else some after-EQ may still be needed in the hf and high mid, so just sub-20Hz stuff is able to be listened to in isolation.

The subsonic realms may be badly polluted—but not all environmental noise is antimusical or inapposite. Not by any means. Subsonics is ambience. The thrum of a stage being rocked over would seem anathema, like miking up the side walls of a bad speaker cabinet, yet with a decent sound system, some subsonic 'rubbish' adds to or even makes, the sheer palpability of the replay. But as mentioned, too much reality may prove troublesome. Quite high SPLs are needed to make any subsonic sound explicitly audible to a crowd. In a competitively tendered PA system, or any system when being driven hard, opening out the response to subsonics so it can be felt 'above the crowd' would eat up valuable headroom, or else require a much more powerful system. Fortunately, live subsonics are not in need of much (if any) amplification. But if omitted from recording by excess enthusiasm for upfront 'cleanliness', something palpable has been lost for ever. The 120pm buzz from a dance floor is a 21Hz beat. More than a few speaker systems can give a sense of this, given swing and headroom enough. To capture the irrecoverable one could have a dedicated a separate subsonic channel, with an old D12 buried in the dusty lumber pile under the average stage; or dug into the soil at a festival. Such a sub-sonic track could be added to audiophile release mixes, but omitted from versions seeking radio play. There could even be a subsonic track activating digital code included on future digital media.

The message is to listen to the baby and the bathwater before you throw them both out. Careful with that 50Hz HPF switch, Eugene.

1977: The aftermath of a rogue white-label pressing demonstrates the undesirability of excess low frequencies in a mix.
performance. Contact the Euphonix office nearest you about how a Euphonix CS2000 can enhance your studio's flexibility and sound quality. If you want to learn more about a commercial studio with the ultimate in speed, clarity, Euphonix and Stroudshearn, read the boundaries of

that personal touch is essential. Recording audio in a wide range of work with artists' acoustic recording a wide range of work with the major record labels' producers, engineers and

We are a commercial studio with

for individual clients.

customized

www.americanradiohistory.com