DIGITAL AUDIO WORKSTATIONS

Akai DR8; Fairlight MFX3; Studer Post Trio
NAB 95 DAW developments; Open Media Interchange
Software longevity solutions

Hard Disk Systems
Digital distraction or nonlinear necessity?

Warner Bros Studio
Postproduction perfection in California
Here's SABREplus, a breakthrough from DAR, the company that defined Digital Audio Workstations. Taking the original Sabre concept to new levels of productivity, SABREplus combines editing, from both hard and optical disk, with powerful mixing and processing. A built-in networking facility delivers true multichannel communication with other DAR compatible systems. While SABREplus' new graphics capability makes things move faster than ever. There's more. Multi-format Open Media is fully supported. And as for the price, let's just say this is the most affordable DAR ever. Call today to find out more.
Border Crossing

My March leader worried of the issue of the progressive destruction of barriers—physical, social and political—and the part played by technology in this particular aspect of progress. The message, like the issue itself, was not clear. It was more a collection of facts and observations than a reasoned argument, through which I attempted to bring our collective attention to an area that certainly has to be a source of trouble, yet may offer untold possibilities in days to come.

A few months on, the following incidents demonstrate that nothing much has changed.

I gave a couple of examples of how our convergent business has been wrong-footed by barriers within manufacturers organisations. I drew those from 1987, but the recent NAB convention proved that the same problems prevail in 1995—after my comments. In this case, while the US arm of one Japanese company were proudly launching equipment, other territories' branches were desperately trying to keep its existence under wraps. 'Would I cooperate with them?', they asked. 'But I'm editing an international magazine,' I replied...

Last month, in San Francisco, maverick computer programmer Dan Farmer released an Internet security testing program called Satan (aka Satan). While the original intention was to offer Net users a tool to check their own security measures, the program can obviously be used by hackers to identify system openings. While news of Satan has carried readily around the world on the Net, less is known of a US Government counter-initiative called Courtney to provide warning of when Satan is being used to probe your network security.

So while Farmer's motives appear honourable (Satan was highly-publicised to cancel any advantage it would give hackers), those network operators closer to the US Government can expect to have a lead on those still in the dark over Courtney.

The conclusion drawn by The European Magazine was that 'the Net is no place to be doing business because it is so insecure'.

In an even more confusing incident, I recently found myself at the sharp end of a complaint concerning an advertisement carried by Studio Sound. A Dutch female reader had complained to the Dutch ASA that she considered one particular ad to be sexist. The Dutch ASA handed the complaint to the British ASA on the grounds that Studio Sound is published in the UK. I pointed out that the ad was generated by an American company and that the magazine is circulated in well over 100 countries. The matter remains unresolved.

The writing is on the wall: the world is shrinking and such anomalies need to be resolved. In the case of pro-audio industry, I fear that those companies choosing to maintain 'regional attitudes' will find themselves increasingly at odds with other aspects of the business. This is much more than a PR problem—can facilities and operators reasonably be expected to be penalised for operating within particular territories? Will the situation result in facilities choosing their location with respect to that of manufacturers? Will it encourage a fresh outbreak of 'grey imports', circumventing manufacturers' internal politics at the expense of appropriate technical support? Neither of these scenarios are acceptable to me—nor, I suspect—are they acceptable to the majority of the pro-audio fraternity.

With particular examples in mind, it is apparent to me that the lesson was not learnt in 1987 any more than it was learnt in 1992 when AES tried to exercise some rather unorthodox control of the launch of the ADAI. It was certainly still here in at the time of 1995's NAB Convention. Are we ready to learn now, or are we prepared to pay the price?
What Our New 20 Bit A/D Converter Does For Your 16 Bit Sound.

Unobstructed, the human ear is a remarkable piece of audio equipment. And, unless you've operated a jack hammer for years, chances are you can still hear all the way up in the 22 bit range.

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Priced at under $1,000, it's substantially more than a box of q-tips. But if you keep your ears clean, we guarantee you'll hear a world of difference.
World Events

May 1995
- May 1st, IEE Audio Engineering Colloquium, IEE Head Office, Savoy Place, London, UK. Tel: +44 171 240 1871 x2206.
- May 3rd–4th, Apple New Media Forum, Cannes, France. Tel: +33 93 39 74 38; +1 800 260 9099.
- May 9th–12th, Pro Audio, Light and Music China 95, Beijing Exhibition Centre, People's Republic of China.
- May 13th–21st, MultiMediale 4, 2KM-Centre for Arts and Media Technology, Karlsruhe, Germany. Tel: +49 721 930 40 0.
- May 14th, National Vintage Communications Fair, NEC, Birmingham, UK. Tel: +44 1386 331552.
- May 15th–20th, Expo Comm Moscow Sviat 95, Krasnaya Presnaya Fairgrounds, Moscow, Russia. Tel: +70 95 255 3739.
- May 16th–18th, DSPx 95 Exposition and Symposium, San Jose, California, US. Tel: +1 203 840 5652.
- May 17th–20th, KOBA 95, Korea. Tel: +82 2193 3221.
- May 18th–20th, Conference: Lone Wolf MediaLink Development, Claremont Hotel, Seattle Washington, US. Tel: +1 206 728 9600.
- May 23rd–25th, Midem Asia, Hong Kong. Tel: +44 171 528 0086.
- May 30th–June 1st, ShowTech 95, Messe Berlin, Berlin, Germany. Tel: +49 30 3038.

June 1995
- June 5th, BKSTS Visit: CRL. Tel: +44 171 242 8400.
- June 5th–6th, Apple New Media Forum, Los Angeles, California, US. Tel: +33 93 39 74 38; +1 800 260 9099.
- June 8th–10th, 2nd Annual South American Pro Audio Expo, Centro de Extension, Santiago, Chile. Tel: +56 2 633 1994; +1 914 955 0489.
- June 8th–12th, China Sound Light & Music, Beijing Exhibition Centre, People's Republic of China.
- June 8th–13th, International Television Symposium and Exhibition, Montreux, Switzerland. Tel: +41 21 963 3290.
- June 10th–12th, 12th ShowBiz Expo West, LA Convention Centre, Los Angeles, US. Tel: +1 714 513 8400.
- June 13th–16th, ExpoShow 95, St Petersburgh, Russia. Tel: +70 812 271 4147.
- June 14th–15th, Apple New Media Forum, New York, US. Tel: +33 93 39 74 38; +1 800 260 9099.

July 1995
- July 12th–14th, Pro Audio and Light Asia 95, World Trade Centre, Singapore. Tel: +652 865 2533.
- July 17th–19th, WCA 95, Wireless Cable Association Show, Washington Convention Centre, Washington, US. Tel: +1 202 452 7823.

August 1995
- August 17th–20th, Popkomm, KölnMesse, Köln, Germany. Tel: +49 221 8210.

September 1995
- September 10th–12th, ECTS, Olympia Grand Hall, London, UK. Tel: +44 181 742 2828.
- September 10th–13th, PLASA, Earls Court 2, London, UK. Tel: +44 171 370 8179.
- September 14th–18th, IBC 95, RAI Centre, Amsterdam, Holland.
- September 19th–24th, Live 95, Earls Court, London, UK. Tel: +44 181 742 2828.
- September 21st–24th, Nordic Sound Symposium XVII, Bølkesjø Mountain Hotel, Norway. Tel: +47 2 79 7730.
- September 22nd–24th, ShowBiz Europe, MOC Exhibition Centre, Munich, Germany. Tel: +49 89 47 02 399.

October 1995
- October 6th–9th, 98th AES Convention, Jacob K Javits Centre, New York, US.
- October 17th–19th, Vision 95, Olympia, London, UK. Tel: +44 181 948 5522.
- October 19th–23rd, 9th International Audio, Video, Broadcasting and Telecommunications Show, IBTS, South Pavilion, Milan Fair, Milano-Luissudire, Italy. Tel: +39 2 481 5541.
- October 24th–26th, REPl:ttech Asia, Singapore International Exhibition and Convention Centre, Singapore.
- October 25th–28th, Broadcast Cable and Satellite India 95, Pragati Maidan, New Delhi, India. Tel: +91 11 462 2710.

November 1995
- November 1st–5th, Audiodevideo’95, Lenexpo Exhibition Complex, St Petersburg, Russia. Tel: +7 812 119 6245.
- November 2nd–4th, Broadcast India 95, World Trade Centre, Bombay, India. Tel: +91 22 215 1396.
- November 7th–9th, Wireless World Expo 95, Moscone Centre, San Francisco, US. Tel: +1 301 986 7800.
- November 9th, 20th Sound Broadcasting Equipment Show, SBES, Metropole Hotel, NEC, Birmingham, UK. Tel: +44 1491 838775.

December 1995
- December 5th–9th, Expo Comm China South 95, Guangzhou Foreign Trade Exhibition Centre, Guangzhou, Peoples Republic of China. Tel: +861 841 5279; +1 901 596 9000.
- December 6th–9th, Communications India 95, Pragati Maidan, New Delhi, India. Tel: +91 11 462 2710.

January 1996
- January 5th–7th, Showbiz Expo East, New York Hilton and Towers, New York, US. Tel: +1 513 8400.
- January 30th–February 1st, SortExpo 96, Santa Clara Convention Centre, Santa Clara, US. Fax: +1 303 745 5712.

February 1996
- February 13th–16th, Expo Comm Mexico 96, World Trade Centre, Mexico City, Mexico. Tel: +1 301 986 7800.

September 1996
- September 18th–23rd, photokina, KölnMesse, Cologne, Germany. Tel: +49 221 821 0.

November 1996
- November 5th–9th, 1996, PT/Expo Comm China, China International Exhibition Centre, Beijing, Peoples Republic of China. Tel: +852 525 592 3257; +1 301 986 7800.

February 1997
- February 22nd–24th, Middle East Broadcast 97, Bahrain International Exhibition Centre. Tel: +971 1 486 1951.
International News

In-brief

ABC at KOBA 95
Audio Follow and Netia are showing at May's KOBA 95, held in Seoul, Korea. The two companies are exhibiting their full range of network products solutions, from news-assist to broadcasting, forming what they call A B C, the Audio Broadcast Concept.

Audio Follow, France.
Tel: +33 1 46 07 26 26.

Royal Television Society recruitment drive
The Royal Television Society are launching a campaign to encourage more television industry professionals to join, pointing out the difficulty and necessity of keeping pace with technological change.

To promote the campaign a special membership rate of £35 (as against the usual £49) has been introduced for new members joining in 1995.

Royal Television Society, UK.
Tel: -44 171 430 1000.

APT Japanese venture
Audio Processing Technology have announced that they have now supplied over 100 digital audio codecs employing proprietary apX compression to radio broadcasters in Japan. The systems are widely used by SDN audio transmissions between studios and for studio to transmitter links.

Audio Processing Technology, UK.
Tel: +44 1222 371110.

Wohler extract digits
The first Wohler, powered, stereo monitor with a built-in Serial Digital Audio Extractor (SDAE) has been installed at the Premier Sports Network facility in Sydney, Australia.

The SDAE option allows direct monitoring of embedded audio in serial digital-video signals. The unit is a 1u-high AMP-1A, which incorporates five speakers and three power amplifiers. Other options inside the unit include a separate AES-EBU input and analogue line outputs. PSN's new monitor serves as a technical monitoring facility, and is located next to the main router serving PSN's two new fully digital on-line edit suites.

Wohler Technologies, US.
Tel: +1 415 589 5676.

Lightworks
Tektronix Inc and Lightworks Editing Systems Ltd have reached agreement for Tektronix to acquire Lightworks. The deal, described as a pooling of interests, focuses on the integration of Lightworks' editing systems with Tektronix' disk storage, networking and archival systems.

Lightworks, UK.
Tel: +44 1292 794099.
Tektronix Inc, US.
Tel: +1 503 685 4038.

Amplex to be sold
Amplex Media Corporation have announced that a letter of intent has been signed by Amplex Corporation to transfer ownership of AMC and subsidiaries as part of a restructuring of AMC's debt. The new owners will be a group of international financial institutions who are AMC's existing lenders. As part of the restructuring, a portion of AMC's existing debt will be exchanged for equity.

Thomas J Wheeler, President and CEO of AMC, comments: 'We are very pleased to advise our customers, employees and suppliers of these developments. This restructuring will balance our financial resources with the requirements to succeed in the dynamic global marketplace for professional users of recording media.'

AMC will continue to do business worldwide through current subsidiaries in the United States and elsewhere. It is anticipated that a final agreement and closing of the transaction will be completed within 90 days. AMC and its affiliates will operate under new names to be announced in the near future.

Amplex Media Corporation, US.
Tel: +1 415 367 3889

Studio Accord set up TDG

The UK Studio Accord have announced the start of a series of Technical Discussion Groups (TDGs) aimed at exchanging information between member studios and identifying common technical problems. The Accord membership, currently standing at 18 studios, includes top names such as AIR, Abbey Road, CTS, Metropolis and Sarm.

The first TDG was held at AIR Lyndhurst in April, and was attended technical heads from the membership along with representatives from the Accord committee.

'It was the first time that so many Technical Heads of Department had been brought together in one room, and it was a very enlightening experience,' commented Accord co-chairman Peter Ford-Crash from Eden Studios. 'What fundamentally came out of this introductory meeting was that many of the problems studios thought were unique to themselves were in fact widely shared. By bringing issues out into the open and communicating problems, I believe these meetings will prove very valuable.'

A wide range of topics were discussed at the three-hour meeting, including interfacing, tape formats, manufacturer support and technical training. At future TDGs, the Accord plan to invite manufacturers to contribute to the discussions.

There is certainly a lot we can learn from talking directly to manufacturers and vice versa,' said Ford-Crash. 'I think there is far less communication between studios and manufacturers than there used to be, and this will provide an ideal opportunity for us to get together and rectify that.'

Studio Accord, UK. C/o APRS.
Tel: +44 1734 756218.

SPARS code reinstated

SPARS (Society of Professional Audio Recording Services) board members have voted unanimously to reinstate the SPARS recording code which was established shortly after the introduction of the CD and retired in 1991. Initially, the SPARS code was displayed on albums, cassettes and CDs to differentiate between analogue and digital in the three stages of recording, mixing and mastering. During the introductory period of digital recording the three-letter code served to educate the public about the new technology. Never intended as a value judgement of analogue versus digital, the code was retired after a decade of industry-wide acceptance of digital technology.

Today, with both formats developed to an unprecedented degree and utilised at the discretion of the artist, producer, engineer and record company, it is felt by SPARS that the code serves a worthwhile function in accurately documenting the process of audio recordings.

SPARS, US. Tel: +1 407 641 6648.

Xmidi grows

Digital Design and Development reported growing interest in the Xmidi extension of MIDI at the Frankfurt show. Meetings at the show resulted in several companies agreeing to their interest to be made public, with official endorsement from C-Lab Digital Media, Passport Designs, Midtemp GmbH and Charlie Lab Srl; other interested names include Akai, Allen & Heath, Böhm, Emagic, General Music, Kurzweil, Lexicon, Mackie, Midiman and Penny & Giles. These are some of the 80 companies that have been meeting since March 1989, as part of which have Secret Agreements in place while 24 evaluation and development kits are in their development labs.

Digital Design and Development, Belgium. Tel: +32 2 2702797.

Brussels: Dan Lacksman, Belgian Producer of ambient dance group Deep Forest, has installed a Sony PCM-3348 DASH recorder in his second Synsound Studios facility in Brussels. Synsound started out as a modest home studio, but subsequent success forced Lacksman to add a new Munro-designed facility, redeveloped around a old house and a former brewery. The 3348 is the first in Brussels, and joins other Sony equipment including C-800 and 800G microphones.

Sony Broadcast and Professional Europe. Tel: +44 1256 483686.
Singapore-UK. By the time this appears a world first should have happened: two artists in different hemispheres and time zones recording a single together at the same time via SSL's Worldnet/ISDN link. Japanese guitarist Hotei will be at Form Studios in Singapore along with Phil Ramone, recording with Jesus Jones at Peter Gabriel's Real World. Ramone has worked extensively with ISDN, on Sinatra's two Duets albums, but this will be his first time recording and mixing a single while communicating simultaneously with two artists separated by over 7,000 miles. The result should be released the following day at SE Asia's music industry convention, IMM '95 in Singapore.

Solid State Logic, UK. Tel: +44 1865 842300.

Leitch links for Digital's Alphas

Leitch Technology Corporation have announced a major contract to design and manufacture a broadcast quality, real-time, 10-bit, digital, video, audio and time-code 'PCI' interface for Digital's Alpha 64-bit computers. The interface will process time-coded and genlocked 8-bit or 10-bit serial digital video and provide for two AES-EBU stereo audio inputs and outputs to allow simultaneous record and playback of up to four channels of monaural audio. The video input and output is serial 4:2:2 (as per SMPTE 259M) with a full 10-bit path supported in real-time uncompressed mode. If the user chooses a compression ratio, then a JPEG compression and decompression path is selected. The initial device-driver support for the module will be for the OSF/1 operating system. The full AES frame and subframe structure is maintained through the interface and is never compressed.

Leitch Technology Corporation, UK. Tel: +44 1256 880088.

ISDN from M Corporation

The M Corporation and 4-Sight International have joined forces to launch a new system for transferring digital-audio files around the world using ISDN. Intended to replace the traditional courier service, the system expects to deliver an average 3-minute digital soundtrack recorded for proofing at 32kHz from London to Los Angeles in around ten minutes, and the use of the MS board allows a broadcast quality 44.1kHz file to be transferred in the same length of time.

The M Corporation, UK. Tel: +44 1425 470007.

BBC log with Prism

The BBC's World Service Monitoring have ordered a 160-channel digital-audio recording system from Prism Sound, based on Prism's Transvers fileserver and TR4000 workstation products. The system will log broadcast transmissions on hard disk for short-term storage and on 4Mb DDS2 computer DAT drives for archival use. It provides remote operator workstations which allow instant access to the last 16 hours of material from all 160 channels, even if the desired item is still recording, while older items can be restored if needed from the archive DATs.

The Prism Sound equipment replaces an analogue tape-based system and provides improved audio quality with both disk-based and tape-based digital storage. For retrievals within 16 hours of broadcast users will no longer have to recover recordings from tape and it will no longer be necessary to interrupt recordings when immediate processing is required. Recordings are selected by Station or Channel and the time of broadcast.

The new system can be expanded if needed by adding more recording modules and disks or by connecting more operator workstations.

Prism Media Products, UK. Tel: +44 1223 224988.

First trans Pacific Dolby Fax

Australian postproduction facility Soundfirm have just completed the first trans Pacific use of the Dolby Fax system on the major US feature film The Mighty Morthy Power Rangers being edited in Los Angeles.

The system was used to meet Director Bryan Spicer's need for ADR from two of the film's actors based in Australia without the cost in money and time of travel to the States.

During the 6-hour session not only was two-way communication maintained but both the director and the actors were able to watch the same scene image in perfect sync by locking up the video machine in LA with the local machine in Sydney.

Since then Soundfirm have used the facility for last-minute changes to the rough mix for A Kid in King Arthur's Court. The changes were made at a day's notice and transmitted via Dolby Fax to the US where the mix was recorded and reinserted into the mix in time for the audience preview that evening.

Dolby Laboratories, US. Tel: +1 415 558 0200.

Dolby Labs, UK: +44 1793 842100.

Soundfirm, UK. Tel: +61 3 880 8488.

Contracts

- New Tokyo venues

Recent sales of EMO's GEO graphic equaliser range include twenty units to the two venues in the new Ebisu Garden complex in Tokyo, supplied by MTC Japan. The equalisers, 16 single-channel GEO20s and four GEO80 twin channel, are to control the various sound systems in the Garden Hall and the Garden Room, including one of Japan's biggest Turbosound Flashlight systems.

EMO Systems, UK.

Tel: +44 191 373 0787.

- Euphonix in Des Moines

The latest sale of a Euphonix CS2000 goes to SR Audio and Cinema Productions in Des Moines. The 48-channel desk has SnapShot Recall, Total Automation and onboard dynamics, and helps the studio in their practice of spending days on commercial production, music scoring and audio post, and evenings working with local and regional artists.

Euphonix, US. Tel: +1 818 786 1666.

- Microns for Jordan

Audio Engineering manufacturers of Micron radio microphone systems, have supplied their 6-way MDS-2 diversity rack, together with TX501 Series UHF pocket transmitters and hand-held transmitters, to Jordan Radio and Television. The contract was won by local company May Electrical Engineering after competitive international tender.

Audio Engineering, UK.

Tel: +44 171 254 5475.

- Red 6 on target

Only just launched at the Paris AES Focusrite's Red 6 microamp, EQ and fader has already sold over 100 units in Europe, the States and the Far East. In addition, five ISA-315 Isomorph Mastering EQs have been sold in the last month to Japanese facilities including both JVC and Denon's Mastering Centres and King Records.

Focusrite Audio Engineering, UK.

Tel: +44 1628 819456.

- Meyer and the Beast

Jands Production Services of Sydney have opted for Meyer loudspeakers for the Australian production of Walt Disney's Beauty and the Beast, following New York and Los Angeles productions with all-Meyer sound systems. This sale, direct from Meyer Sound to Jands, includes two of Meyer's latest products, the UPA-2C and UPM-2 Reinforcement loudspeakers, making Jands one of the first Australian sound companies to use them. The entire system will be tested and aligned with Meyer's SIM System II.

Meyer Sound, US.

Tel: +1 510 486 1166.
"Obviously, These Guys Are Serious About Audio."

—D&R Orion Review, Mix Magazine

If you weren't aware of how popular D&R consoles have become, we understand. After all, we're not very good at taking a lot of noise.

As thousands of D&R owners know, however, it takes more than our 20-bit-ready noice floor to sound good. It takes more than our acclaimed Hi-Def EQs, and our RFI-killing welded-steel chassis and star grounding designs.

It also takes attention to a spec few console manufacturers are willing to discuss. We're talking phase coherency—which we tackle head-on by meticulously phase correlating each and every audio stage in every module in every console we craft. The result? Virtually no audible phase shift.

Is all our trouble worth it? Yes. You see, if we settled for "industry standard" phase specs, your music and audio could suffer up to 100% more phase shift. So thanks to our trouble your D&R will deliver sonic ecstasy. Not sonic smear.

Like the magazine said, we're serious. True, maybe we'd have to settle for industry standard performance if we stopped handcrafting consoles, and started assembling them. But we assure you that's another phase we won't be going through.

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D&R crafts remarkably affordable consoles for music, audio, broadcast, post production, and sound reinforcement. Call us for a free reprint of the 2/94 Mix Magazine Review.
Rode NT2

Newly available from Australia (European distribution through HHB/de the Rode NT2 studio condenser microphone. Reckoned to compare favourably with expensive industry-standard models, the NT2 features selectable omni and cardioid polar patterns, a 10dB pad switch, a switchable high-pass filter and gold-plated output connector and internal head phone. All wiring is of audiophile grade and the large capsule features a gold-plated membrane. A suspension mount is available separately.

HHB Communications, UK. Tel: +44 181 962 5000.

Motionworks trackworker

Studio systems integration specialists motionworks have introduced a new track management unit called trackworker which provides simple and reliable interconnection of any serial-based transports to utilise the console track-arming facilities on SSL 4000, 6000, 8000 consoles. Trackworker permits full track selection of all serial machines, such as ADAT, Tascam DA-88, Otari RADAR, DAT and VTRs, from the console, making it simple to read tracks for recording from the individual channels on the console.

The unit consists of a single 1U-high processor and a console-specific interface module, and can interface directly to a maximum of 24 ADAT or DA-88 machines with additional serial ports provided for DAT and VTR machines. Console Interface Units can be cascaded to provide up to 128 channels. An automation serial connection is also provided to allow for future connection to 'intelligent' control-surface consoles such as the Euphonix CS2000.

Motionworks, UK. Tel: +44 1865 865355.

In brief

● Portadat upgrade
In response to overwhelming customer demand, HHB communications have announced that owners of the Portadat PDR1000 portat DAT recorder will, after all, soon be able to upgrade their machines to PDR1000TC specifications, equipping them to record, generate and reference to time code. The upgrade, to cost £2,250, will be available from the end of August.

HHB Communications, UK. Tel: +44 181 962 5000.

● B&K 2812 Mult Mic amp
Bruel & Kjær have implemented their acclaimed range of microphones with the new dual-channel microphone amplifier, Type 2812 Mk II. The unit uses new state-of-the-art operational amplifiers to achieve low self-noise and a claimed dynamic range of up to 140dB. It carries both electronically-balanced and single-ended line-level outputs, and quotes a frequency range of 15Hz–20kHz [sic] within 0.5dB.

Danish Pro Audio, Denmark. Tel: +49 48 142828.

● Studer DB27-MCH upgrade
Studer are offering worldwide to all their DB27-MCH users an upgrade kit (hard and software) that gives access to new and enhanced features like DASH lock, configurable digital I-Os via channel remote, and an even faster tape transport. The offer is valid until the end of June 95.

Studer Professional Audio AG. Tel: +41 1 870 7511.

● Piranha Cables
A new name in cables, Piranha manufactures a comprehensive range of high-quality cables for musicians, studios and hire companies. All are made using oxygen-free cable with high-density, spiral-braded, shield for good hum-and-noise rejection and extremely flexible PVC covering, terminated with black Neutrik connectors or on 100m reels. Standard colour is black, but other colours can be supplied at no extra cost, and names can be printed on the cable itself, also at no extra cost on bulk orders.

Piranha Cables. UK. Tel: +44 1435 861816.

● Virgin M-O disc
Virgin Euromagnetics have announced a range of 3½-inch and 5¼-inch magneto-optical rewritable disks to complement the company’s diskette and tape cartridge product series. The single-sided 3½-inch disk comes in two versions, 128Mb and 230Mb, while the double-sided 5¼-inch disk offers up to 16Gb.
The advantage of the new system is that multiple digital-audio workstations with different capabilities—from small, low-cost journalist news systems to large multitrack editing and mixing systems—can be linked together in a seamless production ring. Users can share common sound files and access them simultaneously in real time as well as sharing hard disk space, I/O devices and system processing resources. The production network can be bridged to a playlist management system so that finished projects can move from production to on-air without passing to another medium. Some Solutions’ success continues with credits on films including The Lion King and the Forrest Gump orchestral score, and the claim that more than half this year’s Grammy-nominated songs were edited and mastered using the Sonic System. Sonic’s NoVotE is also being used by CBS to clean up the audio feed from the O.J. Simpson trial, reducing background courtroom noises before the feed is distributed throughout CBS.

Conford ENG

New at NAB was an ‘over the shoulder’-style ENG mixer from Conford Sound Systems. The 4-channel mixer is housed in an all-metal chassis with a machined, anodised aluminium front panel, and all controls are located on the front and two side panels. The channels can be linked for stereo applications. High-quality components include Jensen transformers for the balanced inputs and outputs, gold-plated connector and switch contacts and multiple balanced and unbalanced output connectors for maximum versatility in the field. The mixer will operate for up to 12 hours on eight internal AA cells or on a 6-24 V DC external source.

Conford Interfacing

Conford Electronics have introduced a range of three ‘useful boxes’ comprising a headphone amplifier, a phantom-power box and a balancing box. The Headphone Amplifier Box handles balanced or unbalanced signals and has selectable sensitivity and a loop-through facility, and the Phantom Power Box uses a high efficiency DC to DC converter for extended battery life. The Balance Box features true floating, transformerless, balanced input and output and will operate in either direction with both microphone and line-level signals. All three run from internal PP3-type batteries or an external regulated 9 V source.

B&W Matrix HTM

B&W’s Matrix 800 Series has been expanded to meet the demands of home cinema, in the process producing a loudspeaker that B&W expect to be equally at home in the studio as a near-field monitor. The HTM was created primarily as a quality centre-channel monitor to match existing 800 Series models, so is naturally suitable for positioning close to video monitors. It houses a single Kevlar core bass/midrange unit fitted with a high temperature voice-coil wound on a Kapton former, with an externally mounted metal dome tweeter which is magnetically fluid-cooled.

Sound out the UK’s top interconnect range

Deltron DGS range of pro-audio products covers every interconnect application you could ever need.

Think of it this way: Between where sound goes in and where sound comes out, we’ve got the product: XLR, phone, Gotham cable - you name it.

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EMO GEQ60

Over the years, EMO have established an enviable reputation for what might be termed Useful Black Boxes. Without doubt, this UK company are best known for essential but unexciting paraphernalia such as microphone splitters, DI boxes, mains distribution and switching, rack lights and so on. As a result, their graphic equalisers, the GEQ range, have attracted little attention outside their original touring market, being seen perhaps as ‘me-too’ products from a company whose real expertise lies elsewhere.

The origins of the three GEQ models go back some time. They were originally designed with a third party in mind, and since that third party was primarily involved in touring rigs, EMO’s traditional values of rugged construction and reliability were to the fore. In the fifteen years since, little has changed in the design of the filter section itself, but the input and output electronics have received several updates, and the whole range has become a fully-fledged EMO unit in its own right.

The GEQ60 under consideration here is the largest equaliser in the range in terms of bands and channels, although not in terms of size as all three are 3U high. The GEQ30 and the GEQ1515 use 60mm sliders to achieve one 30-band channel and two 15-band channels respectively, while the GEQ60 squeezes two channels of 30-band third-octave EQ into the same size by using 30mm controls. The result, while no more prepossessing than any other graphic equaliser, is certainly not cluttered; the GEQs were designed to be graphic pure and simple, on the assumption that other facilities would be available on consoles and elsewhere. There are therefore no high-pass or low-pass filters or any other extras, each channel having only its 30 filters plus an overall gain control (in 0 to +6dB) and a BYPASS switch with associated LED. What the GEQs lack in external frills they make up for with thoughtful, practical internal design and options. All the inductors in the filters are encased in mu-metal to keep out interference, as is the mains transformer to keep it in. Several sets of internal jumpers allow the unit to be configured for the situation it finds itself in, Pin 2-Pin 3 hot switching for each connector, for instance, and the possibility of operating the equaliser completely ground-free. The basic model is unbalanced out and electronically balanced in, with balancing transformers offered as an optional extra—if these are fitted the unit can still be run unbalanced by means of further jumpers. The jumpers are not the easiest to find or to reposition—tweezers are more or less essential—but this is hardly a criticism as access to them will rarely be needed once the unit is installed. Opening up the top to get at them, however, reveals the very high standard of construction, board design and component selection—this is obviously a thoroughly professional, no-compromise piece of kit.

This shows itself too in the all-important sound quality it produces and in its operational ease. The sliders are smooth with a distinct yet not too stiff centre detent, and when set to those detents give a response which, to the ear at any rate, is indeed flat (EMO quote a response within 1dB, 20Hz–20kHz, with the controls in but flat). The results when they are adjusted are everything you could hope for from a graphic. Early experiences with less august graphic equalisers have left me less than favourably disposed towards the breed as a whole, but the EMO unit seems to lack the peaky, phasy, lumpy side effects which can let down so many designs. The range of the filters is a modest ±12dB, and this fact, coupled with the sensibly-chosen filter shapes, means that it is difficult to achieve anything other than smooth, musical, unobtrusive equalisation even at the difficult bottom end.

It is most likely that a 2-channel over-and-under graphic like the GEQ60 is unobtrusive to EQ a stereo signal, and here a balance must be struck between the convenience of having both channels in such close proximity and the fiddliness of the necessarily short-throw sliders. On the EMO unit it is not easy to be absolutely sure that the two channels are set identically since the travel of the controls is so small and so little of the calibration lines shows between them, but it does seem that if they can be reliably placed in the same mechanical position then they will indeed be at the same electrical setting—the calibration is good. Because of the likelihood that a graphic will be carrying the entire signal on a job—console outputs to amp racks, for instance, or corrective EQ on a monitor system—manufacturers are always keen to push the all-important noise specification. EMO’s figure is -90dBm, which with a maximum output level of +20dBm gives a very healthy dynamic range. The noise level is subjectively very low indeed, with no tendency to add its own contribution as the higher bands are raised.

This is to my mind a very desirable equaliser, which does its job smoothly and competently without any of the typical drawbacks. Its sonic integrity is unquestionable, and it has the vital characteristic of having no characteristics other than that of use and high quality, neutral, controllable sound.

Dave Foister

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Oram Sonics
Vu-More

As mentioned in the recent review of his equaliser, John Oram’s company does not have a huge product range at the moment, but everything he does is that little bit different. What we have here is that rarity, a box with a New Idea in it (although no doubt someone will write in and tell us it’s all been done before). The Vu-More (sorry about the name) looks like nothing more than a pair of vu meters on a characteristic sculpted Oram blue panel, but a couple of interesting features make it a good bit more than that.

The meters themselves are not without their advantages. They are big and brightly lit, and almost certainly closer to the vu standard than the cheap meters fitted to many consoles, particularly lower down the market, some of which are not fit to measure anything but steady tones. The ballistics are good, with not too much overshoot, a fast rise time and a notable lack of wavering about on its way back down. The scale calibrations are not standard, however, which is the first indication that the meters do more than just show signal levels.

Below the normal scale are two unfamiliar sets of figures, one from -70 to -47 and one from -80 to -57. These come into play for the Vu-More’s other role, that of measuring the residual hum and noise levels on the lines on to which the unit is patched. As soon as the signal falls below an internally adjusted preset threshold, the meter illumination changes colour from its normal bright yellow to a distinctive green, and an LED at the end of one of the extra scales shows which one to read. The more sensitive, for use in normal professional situations, has vu corresponding to a noise level of 60dBu, while the other range is 10dB higher. Selection between the two ranges is accomplished by moving jumpers inside the unit, which is something I would like to see reconsidered. In the first place, the potential usefulness of this box makes it worth carrying about from installation to installation, particularly on tour, and the ability to select sensitivity on the front panel would be almost essential for this in order to deal with the different situations one is likely to encounter. In the second place, the way the boards are arranged means that moving the jumpers is just about as awkward as it could possibly be; it also involves removing the bottom cover and half the front-panel screws, and having done it once, believe me, you would avoid doing it ever again if at all possible.

The unit switches between normal signal and noise-measuring modes automatically, without, of course, having any effect on the signal path through it—the Vu-More is designed to be inserted between a source and destination, effectively bridging the lines, so any side-effects would be unthinkable. The effectiveness of this buffering is proved by it lack of clicks even when switched on and off. It does, however, make a mechanical noise as its relays switch over to change the function; this almost turns to a clattering as the signal hovers around the threshold and the meters flip backwards and forwards between their two roles, making it worth giving its location serious thought before installation. As supplied, the switch over happens as the background noise and hum level approaches -60, which is obviously well clear of any wasted signals the standard meters would be capable of showing. The remarkable thing is how steadily it shows such low-level signals, making it easy to see when a problem has been solved or at least improved. Its nature also means that it is not possible for sudden clicks or signal to pegtop it while reading noise—it simply reverts to its normal mode.

In between the meters are two large rectangular LEDs, one red and one green, which indicate the phase correlation between the two channels, green being in phase and red out of phase. Normal stereo musical material flashes the green LED distinctly and the red one dimly, and this flashing of the red initially made me wonder how much use it was going to be; deliberately introducing a problem, however, showed how clearly it was displayed, with the red LED unmistakably showing something amiss.

The phase indication can be used to check the phase integrity of individual lines, in conjunction with the Vu-More’s other main feature, its built-in oscillator. This can be used to inject signal into a device whose output is then compared with the original source, immediately showing out-of-phase lines or inverters electronics. The oscillator is switched on and off from the front panel and has a level trim control and its output appears on Bantam jacks on the front panel alongside similar jacks for patching into the meters, overriding the rear-panel connectors. For those with bantam patchbays this is fine, particularly if the unit mounted near the patchbay, but I can’t help feeling it would have been even more useful to have duplicated the oscillator outputs on the back so that they could more easily be patched as required.

The build of the unit is reassuringly solid, with the unusually thick contoured front panel giving good support and protection to a cabinet which contains more air than anything else. As with Oram’s equalizer, the appearance of the whole thing, with its unusual colour and sensible recessed for everything on the front panel, is sufficiently different from the norm to be both distinctive and potentially not to everyone’s taste. Its usefulness, however, should appear to most people, particularly anyone who ever has to troubleshoot for hum loops, noisy electronics, or dodgy wiring (somebody else’s of course).

Dave Foister
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**Roland VG8 Guitar System**

The search for the ultimate guitar synthesiser-controller goes on. However, with the release of Roland's VG8 guitar system we encounter something of a new direction for the role of the guitar as anything other than just a generator of traditional twangy tones.

Previous attempts at using the 6-stringed instrument as a means of controlling MIDI tone modules have run up against a number of pitfalls — although, in my opinion, the Zeta systems have come closer than any of the others. The problems always centre on the not unreasonable request of selling the module which note is being picked and how hard it is being plucked. MIDI guitar controllers can be judged easily on their ability to generate such information quickly, dependably and sensitively — because most cannot, even before we get into the realms of the string bending, vibrato, hammer-ons and snap-offs that can be encountered even in rudimentary playing techniques. The matter is made all the more frustrating by the seemingly ideal nature of the guitar as a means of MIDI control because of its high degree of variability, playability and inflection, but this only serves to underline the inherent limitations and inappropriateness of the guitar for this task with the current technology and the approaches being taken.

Roland have come at it from a refreshingly different angle with no MIDI controller data output. The VG8 is actually closer to the pure concept of a guitar synthesiser than anything in this area has been since the weird and uncontrollable instruments of the late-1970s. Since the arrival of MIDI, attention has been diverted, perhaps wrongly, to the guitar's contribution as a controller.

With the VG8 you are presented with a lot of features that are not even contemplated on the average controller. Roland's G62A divided pickup serves as the input to the system and senses each string individually and permits each to be processed individually. The system uses the vibrating string as its source, so we are already talking about something higher than the triggering of an external tone box by deriving the pitch from this vibration. The string vibration is used as the source for modelling one of two basic types of sound called Variable Guitar Modelling (VGM) and Harmonic Restructure Modelling (HRM) using a process called Composite Object Sound Modelling (COSM).

HRM takes the guitar waveform and restructures the harmonic content in real time. Any variation in the waveform due to playing technique is registered because it is part of the source material. In fundamental terms, the guitar becomes the oscillator for a synth sound chain. Because of the level of interaction between the sound generation and playing technique Roland are confident enough to recombine techniques to arrive from the combination in order to exploit the sound generation in an even more powerful way. In VGM, exactly the same signal source is used to model every element of the sound-processor chain for a guitar. You can model body shape and the pickups — not only their type but their position up to and including fret 12. The pickup can also be split to pan diagonally from the bridge to the neck, along with in-phase and out-of-phase switching. Each string can be panned individually in stereo and electronic models of popular Boes effects pedals are included with global reverb, delay and chorus.

The next part of the chain to be modelled for an electric guitar is the amplifier and the speaker cabinet. There are models for vintage 2x12 British stacks and even a J120, and you can also choose the type of mic used and where it is positioned. Everything is achieved digitally and internally. A number of all-new derivatives from this the core unit are to be expected, the first of which is the CU32 guitar preamp, amp simulator and effects unit which uses the COSM technology.

The brain of the VG8 is housed in a pedal-board-type floor unit with editability controlled by foot pedals or from a display that is non-based and very graphical — when you move the position of your virtual pickup on your virtual guitar you see a depiction of what you are attempting on the display. The editability of the VGM is potentially extremely powerful. MIDI is restricted to the output and reception of pitch commands, and the device is intended to be totally self-contained. Like a lot of Roland systems these days, the VG8 uses flash memory to store its operating system and consequently can be updated using standard MIDI files rather than chip swaps. Version 2 software is expected to follow once user-feedback has been harnessed and analysed.

At around £2,000 (UK) including the pickup, it does not appear to have immediate mass appeal although if you compare this price to what you are saving, according to Roland, by not having to buy the endless varieties of guitar and amp combination, then you have a bargain even before you throw in the unique synthesis and sound potential.

Along with Yamaha's VL1, the VG8 represents what can only be described as a new generation of sound synthesis both looming similar in attempting to recreate and mimic other instrument types. The VG8 does for the guitarist what the VL1 does for the keyboard player and more pertinent is the wind player. Its introduction is a very exciting and interesting one as it integrates the playability and diversity of the guitar, which has so baffled many regular MIDI guitar controllers, into its very method of synthesis.

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**Music News is compiled by Zenon Schoeppe**
You’ve been using digital tape for years. Now digital mastering makes your final CD sound even better. But often it doesn’t sound like your studio mix — the one you love, the one the artist approved. The advantages of staying digital in the mix are obvious — you avoid multiple analog and digital conversions. **CAPRICORN,** the digital mixing console proven around the world, keeps your mix digital and the sound — phenomenal. For the warmth and depth your projects have been missing, it’s time to get the Capricorn edge.

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W ARNER BROTHERS

Warner Bros have always enjoyed an enviable reputation for lack of compromise in both the look and sound of their film and television productions. During the past several decades it has operated the extremely successful Warner-Goldwyn lot in central Hollywood, which is equipped with several state-of-the-art film rerecording and dubbing stages, as well as editorial facilities. When, in the late 1980s, the Sony Corporation purchased Columbia Pictures, discussions centred on the fate of The Burbank Studios. At that time, the production and postproduction complex was co-owned by Columbia and Warner Bros. Following a series of protracted deliberations, it was eventually decided that Sony would secure total ownership of the former MGM-Culver City complex, and Warner Bros ended up with 100% ownership of the large Burbank Complex. During the past several years, Warner Bros have been refining a series of renovation schemes for the 42,000-foot postproduction facility, culminating in the completion last August of Phase One. The eventual completion date for Phase Two is currently described as being 'on a temporary hold'.

Scheduled for completion during Phase One were the renovation and upgrade of four rerecording stages—two for feature films, and two for remixing television shows—an ADR stage, a Foley stage, as well as 25 digital-sound editorial suites. Phase Two will involve a fifth rerecording theatre, a second ADR stage, plus the refurbishment of the facility's large scoring stage. Other renovation plans include a situation-comedy sweetening stage, and refurbishment of the sound transfer department.

According to Don Rogers, Senior Vice President of Postproduction Services for Warner Bros Studio Facilities, 'Everyone has made such an incredible effort to put together a postproduction facility that will provide unbeatable service for our clients, and keep [our] studio facilities competitive in the postproduction market. Warner Bros is committed to having an in-house facility that is on-line with the highest industry standards. Our new facility is technologically competitive with other studios and post houses for both in-house assignments, and work for outside clients.'

During its first months in operation, the revamped complex handled rerecording for such films as Maverick, Black Beauty, The Untouchables and Demolition Man, as well postproduction for a variety of television series, including the Warner Bros-Amblin coproduction of ER, the hospital emergency-room drama written by Michael Crichton, Great Defender, Lois and Clark—The New Adventures of Superman, and Cosby Mysteries. Recent films completed at the facility include Batman Forever, Outbreak, Under Siege II: The Dark Territory, The Little Princess and Bridges of Madison County. Television series' mixed in the various dubbing stages include Warner Television's Family Matters, Friends, Living Single and Step by Step, plus Seinfeld, Ellen, Roseanne and Home Improvement.

'We have looked hard at the kind of facility that was to operate a facility while under construction,' considers Barry Snyder, Vice President of Postproduction Services, 'last year we had a very successful season. Our creative and technical staff did an incredible job to keep the facility operational with absolutely no loss in quality or service to our clients.'

Film-video stages

The pair of remodelled film rerecording stages, Dubbing 1 and Dubbing 2, house identical, custom-designed Solid State Logic consoles that comprise an array of basic SL-8000G input channels mated to three SL-3000 monitoring sections. The SL-8000's routing capabilities have been heavily modified to provide discrete outputs for today's multiple rerecording formats, including DTS, SR-D and SDSD. The console's conventional LCrs, four stereo buses, A-D, and 24-track routing have been replaced with independent access to eight local buses, complete with inserts and returns, laid out for 6-handed mix sessions; a reassignment matrix handles connection of these busses to the multitrack-dubber outputs.

Each hybrid SL-8000/3000 console features 80 channel strips, for a total of 160 input sources, laid out as 24 channels within the left-hand music-mixing section, 24 channels in the central dialogue section, and 32 effects channels to the right. An outboard bank of three rackmounted SSL Predub Mixers provide an additional 48 line-level inputs for the music, dialogue and effects mixers, with routing to eight output buses per console. A custom interface connects the automation and master faders on each submixer to the primary Ultimation computer that controls the SL-8000's moving fader and related automation functions. Also available are automated joystick paddles; automated graphic equalisers for the dialogue section; plus custom-designed PEC-DIRECT switching for pickup recording during a film mix.

Monitoring on each of the custom boards is described as being particularly flexible. Utilising modules from the SL-5000 Film Series, a 56 x 8 matrix is available for loudspeaker assignments. The 56 available inputs to the monitoring matrix include three, 8-track stems from each section; the master 8-channel mix output; an 8-channel M&E stem; a spare 8-channel source; plus a pair of 4-channel sources (possibly LCrs or a related format). SSL offered us the flexibility of customising the SL-8000,' explains the facility's Chief Engineer, Claus Wiedemann, 'Our consoles are tailor-made to suite the particular way in which we need to work.'

'One of our first commitments is to digital technologies,' offers Barry Snyder, 'but there isn't a digital console on the market that offers the flexibility of an SSL board—and we know that Solid State Logic is a strong company that will be around to support us in our future expansion.'

The monitor loudspeaker system installed in each of the SSL Dubbing Stages was custom designed by Warner Bros' engineers, based on designs that

Dubbing Stage 6 with 'wraparound' 80-input Neve VRP console and companion 64-input 'consolette'
In addition, both rooms incorporate a pair of interesting video-based features. Colour monitors that relay automation information to the music, dialogue and effects mixers are mounted face-up behind the SSL consoles. Half-silvered mirrors are arranged above the respective VDUs to project the on-screen information directly in the respective mixer's line of sight to the screen. In this way, they can continue to focus on the on-screen action as they mix, while still viewing the data being displayed by the SSL Ultimation computer system. In addition, Warner staff have developed a series of large-sized VU meters displayed on large video monitors located just below the screen, and capable of being switched to monitor a variety of signals.

Mixing for television

Also important to the facility's creative future are the provision of rooms that can handle the increasing number of episodic, drama and situation comedy TV shows being completed by Warner Bros' Television Division, and for outside clients. The refurbished Dubbing Stage 6 houses a wraparound 60-input Neve VRP console with Fader automation, and a companion 64-input consolette. The room is home to seasoned Mixing Engineer Charlie McDaniel III, who joined the facility from 4MC, Burbank, just under a year ago. Assisting Charlie McDaniel in the companion machine room and audio-preparation area is Recordist and Assistant Engineer, Robert Bradford III. Originally, Rerecording Mixer McDaniel recalls, his room was built as a scoring stage for small orchestral sessions. But the film and TV industry has been through a number of dramatic changes during the past few years. 'Scoring work became increasingly polarised between large orchestral feature-film sessions that require a traditional scoring stage, such as Warner Bros' Scoring 1, and primarily electronically-produced sessions that are often done almost entirely in the composer's own MIDI-based facility.'

And with increasing client demand. There are fewer higher-tech audio facilities than those operated by giant American film and TV studios. James Douglas visits Burbank to report on the latest innovations at Warner Bros' renovated postpro complex.
production sound effects.

"One blessing from inheriting a scoring stage is the luxury of having a large recording area for pickup Foley and ADR recording, which now form part of almost every mix session we do. The room's acoustics are so similar to the stages where our shows are filmed that matching-in loop lines is a breeze. Speed is important since we mix so many sitcoms per week, including a number of the top-rated, prime-time shows such as Coach, Ellen, Family Matters, Friends, Home Improvement, Roseanne, Seinfeld, and Step By Step.

"During the preparation period last year, we developed flow charts and communication procedures between this room and Warner's Video Operations, so that audio laydowns and laybacks would be handled in a consistent manner. We also spent time fine-tuning our sound effects and dialogue editorial rooms. Time parameters are much tighter for half-hour sitcoms than for episodic or dramatic series. An hour-long show might be allocated a day or two for the mix; normally, we have four hours!"

"Everything that comes to us must be in its proper sequence, otherwise we spend a lot of time just sorting out the elements. Sound arrives in a variety of formats. Music is usually in Pro Tools format on an M-O or removable hard drive. Sound effects built here at Warner Bros are usually delivered on DAW-80 Studioframe M-Os and-or multitrack. Sitcoms are also getting bigger! A recent Family Matters episode, which had the characters visit Disney World, involved 60 tracks of dialogue, music and effects. Original production sound comes to us on either Tascam DA-88 digital multitrack, half-inch, 4-track or time-code DAT.

"Currently, all our mixes are done in stereo. We look forward to making the move to Dolby Surround for most of our shows, but a persistent problem is: What should go into the surrounds?" Because for a live, sitcom—just like a conventional play—the actors are performing on a stage in front of an audience. If the studio audience is placed completely or mostly in the surround channel—to replicate their actual location relative to the actors—then we lose mono compatibility. "In practice, of course, if the audience is positioned in the left and right front channels—rather than hard assigned to the surrounds—then by virtue of the room acoustics and phase relationships inherent in a stereo recording of the audience, a natural-sounding room environment is created automatically. The main challenge is to have our clients become acclimated to the changes required when mixing in surround sound."

"Dubbing 3 currently houses a vintage 56-input Quad-Eight console equipped with GMI Moving Fader automation. The room is used mainly for mixing hour-long television drama series, including ER and Lois and Clark—The New Adventures of Superman, as well as predues for feature films that will be mixed in the SSL-equipped Dubbing 1 or 2.

"ADR 1 is used for looping and dialogue replacement sessions, and houses a small Neotek console. A separate machine room is home to several Otari MTR-90 multitracks used to build dialogue reels, as well as conventional Magna-Tech 35mm mag recorders. Picture playback in the voice-over studio is handled by a video projection system that can also be linked to a custom telecine video scanner for film-based projects.

"Foley 1 houses a variety of performance areas, props, costumes and surfaces. The companion control room houses an automated Sound Workshop fitted with six input-channels routing to 24 multitrack busses."
The Ultimate Analogue Console

9098

by Rupert Neve the designer

Photo courtesy Lisa Stansfield's Graceland Studio, Rochdale, UK.

Configuration shown has 48 9098A Mono Inputs, 24 9098K Dual Monitor Inputs and 4 9098I Stereo inputs. Console has full complement of AMEK SUPERMOVE automation controlling 106 servo faders, 116 channels of VIRTUAL DYNAMICS and comprehensive SYSTEM RECALL.

Rupert Neve's 9098 console is manufactured in the UK by AMEK

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Digital editorial suites

Warner-Burbank has made a major investment in digital editorial functionality. A total of 25 virtually identical rooms can handle a variety of sound-editorial and predubbing functions for both film and television projects. Each room is equipped with either a TimeLine DAW-80 digital audio workstation, or one of the firm's older WaveFrame 1000s. (Recall that TimeLine purchased rights to the WaveFrame system from Digital Effects Corporation, from which it developed the current DAW-80 system.) The newer generation DAW-80 systems are used during all aspects of postproduction for editing dialogue, ADR, effects and Foley—Warner-Burbank currently operates 17 such rooms—while the WaveFrame 1000s with their RAM-based sampling functionality are used, in the main, for editing sound effects and music. All WaveFrame 1000s and DAW-80s now run the same Revision 6.0 of TimeLine's powerful Studioframe editing software.

Regarding the choice of digital audio workstations for Warner-Burbank's sound-editorial rooms, Barry Snyder reflects that 'Technology is a tool:

something that should push creativity to a higher level, and accomplish tasks that we couldn't achieve before. We found the TimeLine systems to be faster and more cost-effective than anything else we had seen.'

But Snyder is insistent that technology should serve the user's needs, and not force the individual to change his or her ways of working. 'Whatever system you use, you should know conceptually what it is you are trying to achieve, and then choose the best tools. Our clients don't really care about the tools we have selected to use—analogue or digital; tape or film—just so long as we can achieve the required result for them: the best-sounding mix that we can produce. When the project reaches the mixing stage, they will ask: "Does it sound the same?" If it is the same or better because we have used a particular workstation, they like it. If it doesn't sound the same, then they don't want to use it. It's that simple.'

Prior to joining Warner Bros, Snyder was with the Sony-Columbia Culver City facility through its various transitions, where he gained a great deal of hands-on experience with the earlier WaveFrame and CyberFrame workstations. 'At Sony, we liked the sound quality of the WaveFrame system. While it might not have offered as many options as, let's say, the Synclavier or Fairlight systems, and maybe wasn't as inexpensive as Pro Tools or Dyazic units, we appreciated the WaveFrame's 24-bit audio bus architecture, and its powerful DSP.'

'And I have found TimeLine to be a great firm to deal with. [Company President] Gerry Block is committed to the film industry, and has developed some powerful workstations and synchronisation systems. Most importantly, the company listens to its customers, and produces user-friendly systems. Let's fact it: film-sound editors have faced the hardest transition from analogue to digital technologies. With companies like TimeLine and the DAW-80, we have some good allies in making that transition as painless and cost-effective as possible. Also, with such a large existing installed base of DAW-80s and WaveFrame 1000s, finding trained staff for our new rooms that were already familiar with the systems' operation was a whole lot easier.'

'And we have also been working with TimeLine during the firm's development of a "digital dubber" that will dramatically reduce the amount of time required to load the multiple sound elements we need to have available for a film or TV mix, and also speed the process of reconstituting temporary dubs.'

'For the money, I don't think that you can buy a better system than the DAW-80. To remain competitive with our room rates, with regard to editing systems the DAW-80 fits our budget nicely, and is powerful yet very easy to use.'

Summarising his vision of the future for the new Warner Bros Studio Facilities, Burbank, Barry Snyder has no illusions about failing to react to the customer's needs. 'We are a full-service facility that has to provide the type of equipment that will attract the client: the best quality people; the best quality service; and the best quality hardware. Our editorial rooms are currently working double shift, and we recently completed six, one-hour and eight half-hour pilots for the coming season. That type of success only comes when you select people and equipment that can handle the workload.'

Warner Bros Postproduction Services, 4000 Warner Boulevard, Burbank, CA91522-0381, US. Tel: +1 818 954 2515. Fax: +1 818 954 4138.
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Peavey Architectural Acoustics announces the all-new MMA™ Series Modular Mixer Amplifiers, packed with more features and occupying only two rack spaces. Flexibility abounds, with eight modular ports and an auxiliary input for a total of nine inputs, two mute busses, Peavey SPS™ (Speaker Protection System), and signal activity illuminators. More security is afforded by the recessed EQ Bypass and Contour Switches and optional tamper-resistant caps.

With nine inputs available, the MMA Series Modular Mixer Amplifiers from Peavey give you plenty of options in designing your sound system, and the ongoing ability to alter that design for future needs. To customize your MMA Amp, Peavey Architectural Acoustics has a full line of quality plug-in modules, from mic preamps with compressors to various auxiliary inputs to telephone paging. And with the Peavey exclusive AUTO™ modules, you get an eight-channel powered automatic mic mixer.

For your sound contracting needs, plug into all the possibilities the MMA Series Modular Mixer Amplifiers have to offer.

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AUX MR Transformer Input w/ Screw Terminals & Muting
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GEN S Electronic Balanced Mic / Line Input w/ Muting & Screw Terminals
MPE S Electronic Balanced Mic / Line Input w/ Muting & Screw Terminals
MPE XD Electronic Bal. Mic Preamp / XLR Connector
MPE X1 Electronic Bal. Mic Preamp / XLR Connector
MPT X1 Electronic Bal. Mic Preamp / XLR Connector
MPT X AUTO Electronic Bal. Mic Preamp / XLR Connector
MPT X AUTO Line Out / XLR Connector
MPT X SR Electronic Bal. Mic Preamp / XLR Connector
MPT X S Line Out / Transformer Input w/ Screw Terminals
MPT X1 Line Out / Transformer Input w/ Screw Terminals
MPT S Line Out / Transformer Input w/ Screw Terminals
MPT S1 Line Out / Transformer Input w/ Screw Terminals

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O
f the myriad developments observed during this year’s Las Vegas NAB Convention, connectivity and file-exchange between workstation platforms figured strongly during discussions with broadcast and postproduction users, setting the agenda for forthcoming R&D efforts. Meanwhile on the Convention floor, Digital Audio Workstations (DAWs) were abundant, with much that was new and newsworthy.

Akai Digital unveiled the new DD1500 modular recorder-editor, which features 24-bit recording and editing (existing 16-bit data can also be replayed on the upgraded AudioFile systems); up to 24 tracks of replay from large format drives; the addition of virtual tracks to provide 24-track functionality from an 8-track AudioFile; and loop editor, direct compatibility with media from the Lightworks editing system (allowing replay of up to eight simultaneous output); and frames display; multitrack transport and control (9-pin serial and RS-232 compatible synchronizers); and the ability to save events lists to Exabyte or diskette.

The American Avid Technology operation unveiled v3.1 software for their AudioVision and AudioStation systems, which provides extra features and enhanced compatibility with the firm’s Media Composer and Film Composer editors. Shipping with the new release are Digital Player-Recorder (DPR) models for recording, digitising, transferring and integration with digital and analogue mixers, including the Yamaha DMC1000 console. Users can now store and retrieve automation data and browse DMC1000 setup parameters, as well as recall and assign effects directly from the workstation software. Version 3.1 also enables users to playback clips digitised with Avid’s 2-field video resolutions, AVR26 and AVR27, by converting them to AVR5, the firm’s highest single-field resolution. VTR emulation is now also supported, enabling Avid audio systems to be

James Douglas surveys the developments in DAWs on show at this years mighty American NAB Convention.

commanded directly from edit controllers. Also to be seen was enhanced connectivity with Digidesign Pro Tools systems via OMF and native file structures; plus AvidNet-ATM high-performance networking configurations, which can now be expanded to WAN (Wide Area Network) topologies utilising Sprint Communication’s Drums service to provide ‘drag and drop’ media access from central servers.

Avid’s sister company Digidesign demonstrated v3.1 of their Pro Tools III software, which now offers up to 48 tracks of record-playback and 64 channels of I/O capacity in 16-track and 8-channel increments, respectively. A QuickPunch feature allows punch-on-the-fly capability, while PostView random-access digital video and a new OMF function offer exchange between Pro Tools and Avid Media Composer files. PostView’s machine control, via 9-pin and V-LAN protocols, enables spotting and layback of audio from within Pro Tools. Also to be seen was Session Software v2.0, which provides software-based multitrack recording, editing and mixing for more simple

The Roland DM-90C multitrack disk recorder

James Douglas surveys the developments in DAWs on show at this year's mighty American NAB Convention.
operator to select an entire range of clips and edit an individual band for the entire section. Having adjusted the individual band, all other settings within the range remain unchanged, even if they are all different. The firm also provided details of a new MPX Film Dubber system for video and film postproduction that will provide control of up to 300 individual tracks with basic reformatting on the re-recording stage. Storage will be to magneto-optical or conventional hard drives.

The Japanese Fostex Corporation were demonstrating the promised DFM Dancing Fader Mixing System for the Foundation 2000, which comprises an assignable mixer-control surface fitted with moving faders and automation of all mixer-DSP settings. The DFM—which was first discussed in Studio Sound’s Foundation 2000 review in February 1994—houses 10 servo-driven faders. These comprise eight Channels, plus L-R and Monitor Masters with individual LED read outs of each fader’s current function and assignment. A set of mode switches enable any Foundation mixer parameter, such as channel strips, monitor, aux sends-returns and mix-bus outputs, to be recalled and reset. An LED menu screen provides more detailed control of DSP and mixer automation modes. Seven rotary encoders provide access to assignable parameters such as parametric EQ, panning, and compression-limiting. DSP and mixer parameters can be saved in one 999 snapshots; all fader and pan positions can be continuously automated against MIDI-based timing references. Current software provides 3-band parametric EQ; a planned update will offer four bands of parametric EQ with high-pass/ low-pass filters. Also shown were TimeFlex time-expansion and time-compression algorithms that allow users to stretch-shrink program material to fit a desired length of time. Release 4 software now includes support of Event Grouping and Patch Bay routing functions for the Foundation’s digital mixer, and also supports SLink file transfer and translation software codeveloped by the US-based Portex Research operation (who were responsible for the Foundation 2000) and The Synclavier Company.

Orban unveiled v5.0 software for the DSE-7000 Digital Audio Workstation, which now offers TimeFit time compression and expansion of up to 25%. Other features include pitch shifting, 2-octave varispeed copy, 2-octave varispeed play (which keeps the output sample-rate constant), reverse audio and enhanced help functions. The DSE-7000 is now fully compatible with the ENCO DAD486 Digital Audio Delivery Systems, enabling files from individual systems to be accessed via a local area network. Radkiewicz of Orban, for example, can now be saved directly in a DAD File Server, and be immediately ready for on-air execution via and DAD workstation.

The Otari Corporation unveiled the new Radar View software for their RADAR hard-disk recorder, available in S-track increments, that provides visual display of the contents and timing relationships of materials recorded across multiple system components, and which is said to greatly simplify the editing and ‘slipping’ of individual track-elements recorded into the system. Also being shown by the Japanese company was the UFC-Universal Digital Audio Format Converter, which handles up to 24 channels of Alesis ADAT Optical, Tascam TDF-1, ProDigital PD, SDIF2 and (optionally) AES-EBU-format I-Os. Multiple units can be interlinked to handle larger configurations. Pro-control routing buttons provide channel rerouting; up to six routing tables can be stored and recalled from nonvolatile RAM.

Pacific Recorders unveiled the ADX Ensemble, a workstation that comes complete with an automated mixing surface. Configured specifically for radio production studios, the ADX Ensemble comprises an ADX-900 Multi-Track Disk Recorder, which combines a single chassis an 8-track recorder-player and a 12-channel mixing system that weighs just over 12lb. The DM-800 provides 100 layers-per-track recording, dynamic automation, MIDI integration and time compression. The system is now available with a direct interface for the Tascam DA-88 digital multitrack recorder that provides eight channels of digital I-O plus full bidirectional machine control; the DM-800 can operate as either a master or a slave. The new RS422/DA-88 Interface also allows direct connection to a video editor, with the DM-800 appearing as a slave to the editor. The interface is a single space rack mount device that can be connected directly to the DM-800 via an RMDB bus cable. A complete set of DA-88 interface connectors are provided for digital audio I-O and machine control. The serial port connects to any device that supports a standard 9-pin protocol in either a master or slave configurations.

British stalwarts Solid State Logic unveiled the new Axiom Preparation Station, a desktop unit which provides shared access to Axiom’s DiskTrack for audio recording, editing and play, plus video recording. The APS system can select up to 24 audio tracks from the maximum of 128 available with DiskTrack. Use of an APS unit as an extension to DiskTrack is said to free up the master Axiom...
How to Succeed with a Sonic

Edit and mix

Analog or digital in—Granny out! It's no coincidence that the majority of the 350 plus recordings nominated for 1995 Grammy Awards were edited on Sonic systems.

Record of the year: A Life in the Day (SONIC Sheryl Crow) edited and mastered by Tom Drescher, Wonder Dog Music.

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Bullet Over Broadway, Hoco Dreams, Just Cause, Pret-a-Porter, The Jungle Book, Apollo 13—what do they have in common? The Sonic System—of course!—because it delivers power and speed for dialog, music, and effects editing for film and video. Our new UltraSonic Processor provides up to 16 channels with full DSP on a single board making multitrack work streamlines and affordable.

Restore priceless recordings for a release

NowNOISE® is used around the world to tackle the problems of tape hiss and ambient noise, clicks and pops, and distortion and crackle. Engineers, artists, and producers wouldn’t trust their masters with anything less.

Cut radio programs without a reel to reel

"I haven’t touched a reel in months," says Bob Carlson from KERN in L.A. That’s because building radio programs with his Sonic System is fast, easy and affordable. Stay tuned around the globe for promos and features prepared on the Sonic.

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The biggest explosions, the clearest narration, the richest music—the Sonic brings life to audio for CD-ROMs. For multimedia pioneers, handling hundreds of soundfiles in all in a day’s work for the Sonic. And with a native AIFF file format and OMF file compatibility, the Sonic is the CD-ROM producer’s choice.

Put the next best-seller on tape

It was a dark and stormy night...the project deadline was approaching...the talent was restless. With my Sonic, I recorded readings directly to hard disk, edited alternate takes, layered up effects, and slapped down a multi-track music bed. "No sweat," I said handing over the finished tape. "My Sonic always delivers a happy ending."

The Ultimate in Power: USP

The USP (UltraSonic Processor) delivers more digital signal processing power than any other workstation—a single USP card includes up to 16 channels of digital I/O, 32 channels of playback, 32 EQ sections. No kludgy expansion chassis or multi-board cabling required.

The Ultimate in Affordability: SSP

Starting at under $4000, the SSP-3 (Sonic Signal Processor) card is the best DAW value around! Each SSP card offers 2-4 channels of I/O, 8-12 channels of playback, and 16 EQ sections.

MediaNet: The Digital Media Workgroup’s Data-Bahn MediaNet, our high-speed FDDI/CDDI network, links Sonic systems (or any standard Macintosh or NFS application) in a seamless network. MediaNet is the only network that allows multiple users to share processing resources and hard disks (even the same soundfiles!) at the same time.

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Production System for large scale mixing projects, while allowing program preparation to be conducted in a cost-effective manner through shared resources. As SSL point out, one of Axiom's major features is the built-in, hard-disk, multitrack recorder and editor. While full-scale recording and mixing is central to the system's Axiom, for a number of applications, such as video and film postproduction, there exists a need to record, edit and play back audio independently of the mixing process. Hence the new APS, which also provides audio conforming and reconfirming to standard EDLs, plus Open Media Interchange via import/export of audio in both AIFP and WAV formats. Also to be seen was v.4.0 software for the Scenariia Digital Audio Video System, which now offers cycle-based automation, fader trim, auto glide and snap automation, off line editing of automation moves, additional EQ curves, events-list editing, multichannel audio waveforms on a display, and use of remote mic preamps and I-Os. 

SonarMix Digital Surround Sound Audio Video System also features new v.4.0 software, plus enhanced Hierarchical SubMix displays and HSM presets, phase reversal on individual HSM mix elements (to create mix minus feeds and so on), enhanced spatial processing, and enhanced reverb control.

DigiCraft's Sonic Solutions demonstrated real-time connectivity and file exchange between a Sonic System, a Silicon Graphics system, Radius VideoVision and a Data Translation systems via MediaNet, the US firm's high-speed network. Also on display from the Americas were the new UltraSonic Processor (USP) card for the Sonic System that offers 16 channels of I/O, up to 32 tracks of disk playback and full DSP up to three cards fit into a Macintosh controller, providing a total of 48-track record-playback. A low-cost Sonic Power Station now offers 2-4 channels of digital I/O, 8-12 channels of disk playback, background loading and on-board DSP. In addition, A new Sonic Radio Workshop Architecture allows broadcasters to configure networks of radio-production systems for preparing news, commercials, trailers, IDs, jingles, PSAs and longer format programming.

Fellow Americans, Spectral Inc, showed the new Prisma music workstation, which has been optimised for music and related production. The system's Edit Panel simultaneously displays from two to 16 channels each of which comprises four layers; the foremost layer is the one currently capable of replay mode. Up to 59 Virtual Tracks are available on the system; up to eight assigned tracks can be replayed together while mixing down to any pair of tracks. The Mixer Panel provides a full function audio waveform on an input and output console, with moving faders, EQ sections, pux sends, panning and related functions. Full object-oriented or waveform-oriented editing is provided, with up to 10 levels of undo. Alternative controllers include the JL Cooper CS-10, or any full-featured MIDI-based systems. Also to be seen was the new Translator 8-channel digital audio format convertor, that sports Alesis ADAT optical (LightPipe), Spectral SMDAI, Tascam TDIF-1 and Yamaha Y2 formats.

Studio Audio and Video unveiled unviiled v.2.2 software for the SADIE Disk Editor, which adds an automatic speech editor for time-domain processing of spoken materials (and described as being specifically applicable to radio production); direct interface to SCSI-based CD-R units for creating fully-compatible Red Book masters via DDP to 8mm tape and Exabyte; a MIDI-based hardware controller card for the JL Cooper CS-10 system, which provides faders, transport controls, mute, solo, scrub and programmable function keys; support for Exabyte 8mm archiving at up to five-times playback speeds; and connection to M-O disks for 20-bit stereo editing and instant backup.

SHOW REPORT

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The Synclavier Company unveiled SLink 2.0, a batch audio-file transfer and conversion utility for Macintosh-based workstations, and which is compatible with different sampling rates, file formats and resolutions. SLINK 2.0 supports WAV, VOC, AIFP/AIFF-C, QuickTime, SoundEdit, MOD, IFP/SVSX, SND-AU, Sound Designer I and II, plus Open Media Framework (OMF) formats. Also to be seen: EditView 4.0 Cross-platform Audio Interface; and a version of AutoConform 3.0 for users of Digidesign products, including Pro Tools, Pro Tools III, AudioMedia and Sound Tools. TimeLine Vista demonstrated several new developments for its StudioMaster v6.01 software and DAW-80 system, which is now supplied with a faster Pentium-based processor. Available in configurations that provide up to 24 tracks of record and replay capability, each disk drive provides access to four tracks with real-time punch-in/punch-out functionality and full video and film postproduction. The system under development is a version of the DAW-80 that incorporates Peavey Media Matrix channel assignment, DSP and mixing firmware, and which will provide an enhanced graphic interface for the system. The DAW-80 will also be available in the near future in a 'digital dubb' format for use in video and film postproduction. The Player comprises a stand-alone rackmounted unit capable of accepting removable media (M-O or hard drives) in TimeLine or OMF formats. Each DAW-80/Studioframe-based unit will play back eight channels; multiple Players will synchronise together via Film Lynx and, through networking, will provide a virtually unlimited number tape tracks, both forward and reverse, plus advance-revert of individual tracks or groups of tracks from a remote PC. In addition, the network software will also allow the firm's editing software to be used to access any of the on-line units, allowing editing operations. Elimination of the transfer operation prior to dubbing—to either mag film or audio tape—will improve flexibility because copy-loop operations can be performed on-line. Also, the ability to perform single-track or multitrack editorial changes or picture conformation on the dub stage, if necessary, should also dramatically enhance film-video postproductivity.

The Japanese Yamaha Corporation unveiled the modular, low-cost workstation system, based on the new CDX-D3 Digital Recording Processor, a 4-channel system that provides two channels of simultaneous recording and four of playback. System operation is controlled from a Mac platform, running third-party editing software (E-Magic Logic Audio CRX, Mark of the Unicorn Digital Performer, Opode Studio Vision Pro or Steinberg Cubase Audio). The DBX-D3 features an integral sample-rate converter, and can be connected directly with the firm's ProMix 01 16-channel digital mixer, to provide an integrated recorder-editor mixer. Also available is the new CBX-D3 upgrade which, in addition to the—D3 features, adds balanced XLR analogue I-Os; AES-EBU, SPDIF and Y2-format digital I-Os, plus parametric EQ and a collection of digital reverber and special effects.
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Byron Scavuzzo, Chief Engineer
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During the late 1970s and early 1980s, the name Fairlight was almost a synonym for elite digital sampling keyboards. Even so, it is still mind-boggling to learn that the Australian company have been building computers for 20 years, and celebrate their anniversary this year. Although there is still a strong historical connection with the significance of the CMI (Computer Musical Instrument) of 15 years ago, Fairlight have survived commercial problems and established themselves in the postproduction market.

Now properly known as Fairlight ESP (Electric Sound & Picture), the company introduced their dedicated audio postproduction workstation, the MFX, in the late-1980s. It was around this time that Fairlight experienced business troubles, eventually being bought out by some of its founding and key members. Since then, the company have worked at the postpro sector, recently establishing an American operation and restructuring the UK company.

'As a marketing enterprise, we see three main areas: the Americas, Asia, and Europe,' observes John Lancken, Head of Sales and Marketing. 'We've also been investing in people, which makes sense because we have a new product that we aim to do very well with.' The new product is the MFX3, the third incarnation of Fairlight's digital editor and storage workstation which has already notched up 15 sales in Europe, including WDR, ORF, Zoo Studios, Essex Radio, the BBC, and facilities in Russia and Spain.

'Sales are a mixture of TV, postproduction and radio at the moment,' says Lancken, 'but the European market is difficult because it is very much public broadcasting orientated. The US has more private stations, while Japan is a mixture of both. We're finding that customers in Germany are using the MFX3 for radio drama, something that it is showing a major strength for.'

The MFX family was the result of a lengthy period of development; Lancken observes that it was two years before the first products appeared. 'It was the late-1980s when we started the move into postpro and disk recording,' he says. 'Culturally we had to address a wider recording market, something more than just music, which we were in with the CMI sampler. That's how we got into film and post work.'

Early versions of the CMI featured a disk-recording facility, the Rev 6, which can be seen as a precursor to the MFX of today. 'We're not new to recording sounds and playing them back direct from disk,' says Lancken, 'we've been doing it since 1985-86, and we've been building computers from the ground up since 1975.'

In that time, Fairlight have identified the four basic elements for a workable, efficient and ergonomic Digital Audio Workstation (DAW). These are: a graphic interface; a user interface; software allowing the recording, editing and manipulation of material, or 'clips' (audio segments) as Fairlight prefer.

Meeting more orders than press calls, Fairlight's digital workstations are attracting increasing attention in postpro circles. Kevin Hilton evaluates the MFX3.
MPX3 4-track display

to call them), and external machine control. ‘The way these are put together is crucial,’ says Lancken, ‘otherwise DAWs can be disjunct. By including control of external units, we can show that all these thing go together.’

User interface

The MPX3’s graphic interface presents seven user screens, some of which share the display, taking either the upper part of the display or the lower. Whatever the functions selected, there will always be one upper and one lower page on screen at any time. These will change automatically according to the recording, editing and transport control commands, but can also be selected by a user command.

The displays are: Arm (showing the amount of recording time remaining on the current disk, length of present clip, and input-output meters); Patch (showing the type of input selected and to which track is going); Track; Takes (displays information about clips, including mono-stereo, audio level, duration, and source file); File; Device (contains a box for each storage device used, showing amount of available storage capacity); Marks (numerical list of named Go To and Edit points); Waveform (a list of all Master Recordings in the project); and System (displays changes to setup parameters).

Of these, the most important are Track and File.

Track information (along with the Arm and Takes displays) is contained on the Disk Recorder Page, which is always on-screen unless other displays are selected, either automatically by the function being performed or from the Numeric Keypad by the operator. The main elements are the 4T screen (showing four tracks), track names, clip names, selected clips, the audio waveform, selected track, and the Takes screen. This provides data on the clips currently being used, including previously recorded layers of clips that still exist ‘underneath’ the last recorded item but which cannot be heard.

The File page appears on the same display as the Device page, showing information about each storage medium at a time, plus the files that it holds. Devices can be operated by G99, D96 or MDR, the method of tabulating and selecting each file is very similar to running a PC in DOS, including the scrolling up and down of lists. Once highlighted, a file can be opened, copied or manipulated in any other form. Only files relevant to the editing mode selected at the time are shown, and the display will automatically appear on screen if a file is being opened or deleted.

Macro keys are used for editing and enabling keyboard macros; Function keys control macros (keystroke recorders); the numeric keypad accommodates time-codes and other numeric entries (fade times, pre-roll points); the ENTER key executes commands and enters numbers; the ZOOM key enables the Jog Wheel to expand and contract the on-screen time-scale from six frames to eight hours; FROM and TO keys select the in and out points on an edit, loop or Auto Record; JUMP keys locate the transport to clip head and tails; TRANSPORT MODE keys open the Autolocator menus; TRANSPORT keys are as you would expect, plus a JOG-SHUTTLE key and the Play menu for transport ‘smarts’. Soft keys select commands from the menu; DISK MODE keys open editing menus; TRACK keys select tracks 1–4 for recording and editing. The remaining key, UNDO, is self-explanatory.

Many of these functions will be displayed on the console’s LCD screen, which also contains the menu choices for the Soft keys. It was these keys, which offer a number of differing applications, that gave me concern. I have often thought that a single key doing several things could be rather confusing: where are we, where are we going, what mode are we in? Lancken counters this doubt by saying, ‘The buttons refer to an operation, but they are always “now” intuitive.’

Operation

Intuitive is a word much bandied about in this computer dominated society. Windows-based programs are seen as better than DOS because they’re ‘intuitive’, allowing the operator to get straight into them without too much prior knowledge or a degree in advanced computing analysis. The new generation of audio editors are computer-literate, but still around is the generation that learned the trade with quarter-inch tape and razor blades rather than a mouse and cursor.

This is not the sign of a Luddite, rather it is a question of practicality. Editing is a tactile activity—sometimes you need to ‘feel’ the words or music as they go over the play heads. The MPX3’s Jog Wheel reproduces this quite well. The other crucial point is: how easy is it to get started? A piece of work on the Disk Recorder is called a Project, and to begin one the operator presses the PROJECT key on the console. The computer will then ask for a name and to which storage medium the Project is to be stored.

Once a Project has been opened, Master Recordings are created within it. Up to 24 at a time can be created, and these will display on a time-down menu, but is faster and less stressful to use. While it is undoubtedly fast, ‘less stressful’ is a subjective statement, depending on the project and the amount of shouting it involves.

The MPX3 console is based around a QWERTY keyboard (so far, so conventional), a Jog Wheel, allowing the device to imitate a tape machine, and a series of keys for a variety of operations. Despite taking up the most space, the main keyboard, here known as Alpha Keys, is purely used for naming tracks and projects; the important keys are those around it.
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then. In this way it is possible to use the first part of one take, and then overlay the second half of another to create a totally new take. The new clips are recorded or pasted on top of earlier ones, which still exist underneath but are not heard. It is possible to retrieve the 'buried' information by trimming off the upper clip.

The preset main function of the MFX3 is editing, so, consequently, the Edit menu is the most powerful of all the menus run by the device. Just like many other DAWs, or, indeed, documents on a WP, material is cut or copied to a clipboard, until it is replaced by cutting or copying again. The wave forms on the graphical display is a visual representation of what is being heard, and makes it possible to work out where to make the edit point. By using the Edit menu, clips, or parts of clips, can be placed anywhere within a Master Recording. By using different tracks, it is possible to match material that may later be replaced. For example, a new reading of a section of dialogue can be matched alongside the original during an ADR session. This, however, does call for skilled voicing and accurate cutting, and does not have the same technological cachet of the WordFit option on DAR's SoundStation. But it is possible to build up speed working this way, and the ease of the Edit menu does give some flexibility. The MFX3 also has the ability to crossfade on the same track in real time due to its DSP technology.

**Machine interface**

Audio-to-picture work is one of the prime targets of the MFX3, so comprehensive machine control is called for. The unit is optionally available with built-in control over industry standard Sony 9-pin serial devices. Any VTR attached to the MFX3 can be put on and off line by pushing a button, allowing the audio to follow whatever the video does, in whatever mode. This mimics extending to emulating a VTR in freeze-frame, whereby a device is paused but displays one frame on screen continually. In audio freeze-frame, a sound is repeated 25 or 30 times a second, and will run together with the video transport give an impression of continuous audio play-back, at low speed but normal pitch. The MFX3 can also synthesise longitudinal time-code (LTC) at all standard frame rates, vertical interval time-code (VITC), digital world clock via digital input or internal crystal. The unit also has an Autoconform function, which allows acquisition of material to be speeded up considerably.

Beside ease of use and the range of functions, a major concern in the choice of a DAW is its storage capability. As standard, the MFX3 uses new generation SCSI-2 hard disks, which gives the possibility of seven storage devices hanging off the system. The largest disk drive (4Gb formatted) provides in excess of 12 hours of mono track time. The disk transfer-rates to and from the SCSI interface are high, and allow continuous playback of 24 tracks coming from a single hard disk.

A lot of DAWs today employ magneto-optical (M-O) drives and Fairlight have also incorporated this option. The MFX3 can play 12 tracks of continuous audio from a single cartridge, and, if the average number of tracks playing does not exceed 12, it can sustain a full 24-track project on one removable disk. While this remains in the realms of 'possible configurations', it would seem that, until M-O technology progresses further, that this option is best suited for preparing material on smaller, offline MFX3 units, and then transferring to the master machine.

M-O can also be used as a backup, but this would be too expensive, especially given that the technology would be used only in a supporting role. Which is where good old tape comes back into play. Oxide-based media is still seen as a useful backup, and it is possible to download from the MFX3 to 8mm data tape cartridges, which can store up to 15 hours of audio and selectively restore them to hard disk.

Since Fairlight's London office for this appraisal, new MFX3 4-band parametric equalisation software has been launched at the NAB Convention. This allows frequency, gain and the Q factor to be altered. The three banks of numeric keys are used to select these functions, with the effects displayed at the top of the graphics screen, while the Jog Wheel is used to control the parameters. The main feature of this new software is that it is a clip-based, which means that the EQ moves with the audio. Only Fairlight and DAR offer this technology.

Fairlight have now established themselves in the postproduction field, but they have not forsaken the area that made its name in the first place. 'We're coming full circle, because we're talking to our old customers about multitrack,' says John Lancken. 'This is the first viable disk recorder and we see it as replacing tape. Musicians want to be spontaneous, pushing buttons and having something happen, so we're talking about writing software that can take multitrack recording further.' Fully loaded, the MFX3 gives 24-track capability, although Lancken claims that its efficiency makes it more like a 32 or 48-track machine.

The Fairlight MFX3 is an impressive piece of equipment, logical, relatively straightforward and fast. There are one or two niggles, like the multifunction keys, but Fairlight have thought out the system well. It is not for the small studio or radio station, however, given that a basic system starts at £19,000, rising to £30,000, although this market is catered for by the MFX3 Mini, which has a base price of £10,000 (UK). If Fairlight succeed in re-establishing a relationship with its original customers, then a fully-equipped, multitrack, disk-based recorder with full editing capability could revolutionise the way postproduction works. It just depends on who gets there first.

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As nonlinear audio and video systems become commonplace, the need for suitable storage systems becomes crucial. Micropolis' Trevor Duplock looks at data, disks and RAID solutions.

The traditional demarcation lines between the computer industry and the audio-video industry have all but disappeared. With market convergence, a new breed of 'prosumers' has been created—those mixing the simple ingredients of a PC or Macintosh, hard disk and sound-video card, and making what is in essence, a digital editing machine. Unfortunately, the speed of this synthesis is producing a wave of confusion: there are audio practitioners who are sceptical about the true need for IT, while the IT companies want to investigate market potential but are quite unsure of where to start.

Some of the main reasons for this convergence concern the advances made in MPEG compression which are opening up the computer market to even the entry level audio-video consumer. This, perhaps, partly explains the huge quantities of peripherals (speakers, sound-video cards and so on) that are currently being shipped with most PCs in order to make them 'multimedia compatible'. However, what these developments constantly succeed in hiding is the increasing problems most end-users are experiencing with their storage medium, primarily hard disk.

This is a fundamental consideration—after all, having a powered-up PC or Mac without a appropriately configured hard drive is like parading a Ferrari at a sports car rally with only the engine of a Mini.

The reality is that not all hard-disk drives are capable of working with A-V data.

One of the reasons for this is a lack of understanding of the storage medium, or more importantly, the need to match your storage requirements with what is available on the market.

In the past, digital tape, standard cassette tape and DAT have been the most widely used storage media and will remain so among some users for years to come. However, many other A-V users are looking at the array of computer-based options now available. Faced with a number of different choices, these A-V users are facing two fundamental problems. Firstly, how does this IT technology actually work? Secondly, will the purchase cost of this new equipment fundamentally improve productivity?

Three choices face A-V users when considering computer-based storage: RAM (Random Access Memory), optical disc, and hard disk. To be most appropriate, the chosen method of storage should depend on user demands, the nature of the application and the kind of performance-reliability required. Users, thus, will need to familiarise themselves with factors such as processing requirements, cost per stored megabyte, access times and transfer rates. For users who do not have an IT background, these are terms that cannot be fully understood without a closer look at the three alternatives on offer.

For a long time, hard-disk drives have been the preferred method of permanently storing information for short term use. Recently, hard disks have come under attack as other types of storage media have gained acceptance. RAM for instance is increasingly being used to store larger programs and disk files, however, it is likely to prove an expensive option for most A-V users. Other advances such as flash RAM, is a serious challenge to the hard disk at the lower levels of storage but will, again, not fully meet the requirements of the higher-end user.

Optical disc media have also been touted as a less expensive method of storage and one of the three types of optical storage, CD-ROM, has already enjoyed market acceptance, particularly in the field of multimedia. However, the fact that it is currently a read-only technology and has slow access times means that its use as a flexible storage option is limited.

The other optical disc options are WORM (Write Once Read Many) and Erasable Optical Disc. Both of these have longer access times than magnetic disks and, as a result, their use is primarily confined to archive and backup storage. However, their suitability for this task has meant that they have started to attack the market for magnetic tape which has, traditionally, been the most popular reference, archive and backup storage option.

Despite competition from other storage devices, the hard disk is quickly becoming the most popular computer-based method of storing information for A-V use. This particular method has gained acceptance through demonstrating the best mix of reliability, access times and transfer rates. In addition, the cost of hard drives is almost halving every year making them extremely competitive with methods of traditional A-V storage.

At this point, it may be useful to consider these particular strengths, looking into how a hard disk actually works.
What is a hard disk?

Today, the most popular hard-disk drive format is a 3 1/2-inch disk—a considerable reduction in size from when the medium was first introduced. This reduction has been made possible by an increase in packing densities which have allowed more information to be stored in less space.

It is claimed, though, that larger disks (larger than 3 1/2-inch) are more reliable and indeed MTBF (Mean Time Between Failure) figures would seem to substantiate this. Large disk manufacturers are quoting MTBF of 500,000 to 1,500,000 hours, while small disk-drive suppliers are citing MTBF of between 100,000 and 150,000 hours. Mainframe disk manufacturers say that the reason for this higher reliability is that large disks have stronger and better engineered motors and spindles, as well as larger and better engineered heads and actuators. Smaller disks do have two significant advantages over larger-sized disks, however, and that is that they can withstand greater shock and vibration and have a lower manufacturing cost.

Despite the fact that larger disks seem to be more reliable, the trend is towards the use of increasingly smaller disks and it is likely that the 3 1/2-inch format will be attacked by sub 3 1/2-inch disks in the future.

Surprisingly for such an integral part of the PC, the hard disk is relatively uncomplicated in mechanical terms. Basically, a motor is used to propel either one or more rigid, nickel-covered aluminum platters on a spindle at anything up to 7,200 revolutions per minute. (This rate is likely to rise as technology improves.)

A small arm, (the actuator) is used either side of the platter to suspend a read-write head 10 microns or less above the magnetic layer of the disk. A slight airfoil lift effect on the actuator is created by the spinning platter stopping the heads from making physical contact with the disk. As these heads fly above the spinning platter, magnetic changes on the disk allow read and writes to be performed. (Again, as technology improves, the efficiency of disk heads retrieving data from the platter is improved.)

In order for information to flow between the computer and the actual hard-disk drive, a disk interface and a disk controller are needed. The former receives the request for information from the computer while the latter gets the requested information from the disk drive and sends it back, via the interface, to the computer.

To complicate matters further there are two types of disk controller: IDE (Integrated Drive Electronics) and SCSI (Small Computer Systems Interface). At present, IDE is the most popular for small and medium hard disks. The major reasons for this is the fact that its high volume of sales have kept prices down and that it is based on relatively simple controller technology. SCSI, however, is the standard for larger drives or multi-user operating systems. Its main benefits are the fact that it can control, from one controller card, multiple devices such as hard drives, tape drives and CD-ROMs. Furthermore, it gets round the problem of compatibility by allowing drives and devices from various suppliers to be linked together. All these features make it ideal for mainstream A-V use.

Many users may be tempted to use the hard disk that comes installed in their PC or Mac, but the chances are that it will not be any larger that 500Mb capacity. Considering that one minute of uncompressed full-motion video data takes up 29Mb, these are be adequate for short video snippets but are too small for the majority of users' requirements.

The average audio user is therefore best advised to look for a hard disk of around 20Gb, which would roughly convert to 50 minutes of 8-track digital uncompressed data. (4Gb produces 50 minutes of 16-track.)

The choice of hard disks, either internal in your computer or external in a small subsystem, is perhaps the most fundamental purchasing decision A-V users will make.

Without a sufficiently capable hard-disk facility, all the accompanying expensive software could not be used to its full potential. The main reason for this is that although modern data processing disks can deliver data to traditional applications very quickly, they often have difficulty satisfying the enhanced I-O requirements of A-V applications. The real-time nature of audio-video applications requires disk drives to sustain a predetermined minimum data-transfer rate. Any delay in the data rate can spell disaster of the sort characterised by jumps, stutters and gaps in motion and sound reproduction. Thus A-V users, when considering the purchase of a hard drive, need to ask their vendor or dealer for those drives that are specifically configured for A-V use.

What is an A-V hard drive?

Although contemporary data-processing disk drives can deliver data to traditional applications quickly, they often cannot satisfy the requirements for digital A-V applications. Because of the nature of audio and video playback, the data must be delivered on time at the required rate. Any delay in the delivery of data from the disk will cause interruption in the playback resulting in blips in the audio and missing video frames. The move to computer-based audio and video systems therefore demands a new type of storage; that can instantly access any video frame, sound or word, but which can record and play back with the same measured precision as tape. This is a sophisticated type of storage for which standard data-processing disk drives are not designed.

As has been seen, for A-V applications, any drop in data rate will mean that sound or pictures will not run smoothly and this will obviously negate the value of using disk drives. As standard disk drives carry out what is termed 'housekeeping chores' (methods by which a standard drive validates the status of the data it is handling) which may cause momentary interruptions of data, they will clearly not be suitable for A-V applications.

Some of the ways in which standard drives can halt the flow of data include Error recovery procedure overhead, rotational retries, thermal calibration, and degaussing.

Error recovery on most contemporary disk drives is very robust and thorough. However, it is the major cause of data flow interruptions. For instance, the recovery from a correctable data error can often take more than 500ms to complete. Digital A-V applications cannot tolerate a delay this large. A-V optimised drives therefore have sophisticated and exceptionally reliable means of error correction that maintain data integrity, while completely housekeeping and recovery tasks much more quickly. In fact, the time required to perform this operation can drop to 10ms or less.

Traditional 'rotational retry' routines are designed to recover soft errors by simply repeating the operation. Although this method works, it has not been optimised for speed. Precious time is lost when a disk tries to reread the data that it could not retrieve on the first check. Disk drives optimised for A-V applications recover this situation by utilising alternative error correction schemes to preserve the data and erroneous data without wasting disk revolutions.
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Data Storage

Thermal calibration—or T-Cal—is necessary to ensure that the disk's heads remain precisely over the data tracks by compensating for temperature changes during normal operation. With the majority of disk drives, a T-Cal requires more than 0.1s to complete. This can be a severe impediment to data flow from the disk and is one of the major causes of dropped video frames and interrupted audio.

A-V drives manage the T-Cal process intelligently so avoiding any break in the movement of data. Through comprehensive disk management techniques, thermal calibration will not occur if there is a pending request for user data. If the T-Cal process has begun and disk data is requested by the user application, T-Cal will suspend its operation allowing the drive to furnish information to the user. Then, as the workload permits, the disk will complete the thermal calibration.

During the normal course of disk operation, the disk's data heads will accumulate a slight magnetic charge. This charge can adversely affect the drive's efficient operation. Before this happens the drive must demagnetise, or 'degauss' each head. Since head degaussing involves at least one head seek plus some rotational latency, this activity can cost more than 40ms and will interrupt the flow of data from disk. By minimising head seeking and rotational latency through a refined degaussing scheme, A-V drives allow the audio and video information to continue to flow to the user application without interruption.

RAID explained

Another major factor for considering high-density drive-based solutions is the reliability they can offer. At the forefront of this is RAID (Redundant Array of Inexpensive Disks) which offers a high degree of redundancy against individual disk failures.

Put simply, RAID involves stringing together a number of small, inexpensive disks to create a storage solution which is ideal for mission-critical applications that need true fault tolerance. Perhaps the best way to explore the concept of RAID is to look at what the acronym stands for.

Starting with the last letter, the 'disks' are, typically, standard, smaller disk drives rather than the Single Large Expensive Disks (SLED) which have traditionally been used for storage purposes. As the disks used for RAID are smaller, then it follows that, relatively, they are also 'inexpensive'.

Linked together, in an 'Array', these 'disks' cannot only cope with very large amounts of data but can also provide fast access times. Imagine you have five disks in an array structure with data spread across them; the time it will take to access that data will be one-fifth what it would be if you were working with a single disk.

'Redundancy' is slightly more difficult to explain as it involves looking at Mean Time Between Failure of disks. Taking the solitary disk again, we can assume that it will have a MTBF of 100,000 hours. However, if you have five such disks linked in an array then it follows that the MTBF will be only 20,000 hours.

This level of MTBF is not acceptable so the RAID approach is to create a certain level of 'redundancy' into each array. This means that your data will not be lost if one of the disk drives in your RAID systems failed. It also means that any data will be automatically reconstructed after a disk crash without you even having to take your system down. RAID can be broken down into six separate levels: Level 0 system has multiple disks in an array and, through the controller, is able to strip (a technique used by proprietary minicomputers for many years) data onto several disks. Furthermore, if this controller is positioned intelligently over the next record to read or write, then disk-access times can be improved dramatically. However, stripping has the major disadvantage that if one of the disks go down then data has to be reconstructed from backup tapes or similar devices. This means that, technically, Level 0 is not really a RAID level because it has no redundancy.

Level 1 provides disk mirroring where data is duplicated onto separate disks. This means that data can be read independently from each drive and if one disk fails then the other can take its place. Mirrored disks offer the advantages of local security as well as improvements in reading times as data can be read alternatively from the disks or by using the nearest available head. Typically, mirrored disks are offered with fault tolerant computers where the security of data is the issue rather than the cost per megabyte.

Level 2 uses a bit-interleave (also known as striping) process, to spread data across all of the drives in the array; the first drive in the array contains the first bit, the second drive contains the second bit, and so on. Separate drives are used to store error-correcting codes or parity information. This creates very slow read times as there is a constant need to assemble disassembled bits from all the disks. As RAID 2 was designed for mainframes and supercomputers, it is not suitable for desktop LAN environments.

Level 3 addresses the problems inherent in Level 2; data is written across several drives but only one dedicated disk is used for error-correction bit checks. The second disk is then used to reconstruct data in the event of any error occurring. While Level 3, disk heads are synchronised which means that read and write transactions can take place at high speed. Consequently, this level is well suited to large file transfers or sequential file reading, updating and writing.

The main problem with Level 4 is its inability to perform simultaneous I/O transactions because large blocks of data are interleaved across all drives. The Level 4 approach differs by placing the entire transfer block on the first data drive, the second transfer block on the second drive and so on. This enables multiple reads and so improves disk performances. The disadvantage of Level 4 is that it uses a dedicated parity drive which contains the parity for all the data drives and is involved in every write transaction. Consequently, writes are particularly slowed down.

Levels 1 to 4 all use dedicated parity drives and are therefore limited to one write transaction at a time. The advantage of Level 5 is that because all the drives contain both data and parity blocks, there is no need for a dedicated parity drive.

As with Level 4, an entire transfer block is placed on a single drive and the parity for that block of data is stored on another drive. This means that if a drive fails, its data can be reconstructed from the remaining drives. By eliminating the need for a dedicated parity drive, the single-write bottleneck is removed so allowing Level 5 to perform multiple read and write transactions in parallel. This last point explains why this level of RAID is regarded as the most suitable for LAN users.

With a description like this it is little wonder that RAID has, traditionally, been viewed as ideal for larger systems rather than the desktop and no surprise that it has baffled A-V users. However, with more and more A-V users now holding increasing amounts of information on their Macs and PCs, demand for RAID systems that can protect desktop-held information effectively is set to explode.

The future

Hard drives have now become an essential piece of kit in this industry. Despite the fact that hard-disks drives represent a greater cost than previous storage mediums most sound engineers and studios will be prepared to finance this extra expenditure in the interests of quality, reliability and efficiency. So how will the hard disk evolve over the years? Well, with increased demand from users wanting to run ever more MB-hungry software applications, disk drive capacities are likely to keep rising. Encouragingly, the recent doubling of capacities is accompanied by a halving of prices per GB. Coupled with this, it is likely that there will be a move to smaller and smaller disks as miniaturisation continues. One thing for certain is that the hard disk will continue to evolve with developments originating from both the A-V and IT sectors.

Although most of the hardware-based technological developments will come from the IT side, it is still the responsibility of the traditional A-V vendors and smaller specialist companies to convert these for the A-V market. Undoubtedly, hard disks are here to stay and, in a few years time, especially when a universal compression standard has been agreed, we will all be looking back and wondering how we survived without them.
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Experience the glow of valve technology from TL Audio.
Anyone encountering Akai's DR8 hard-disk recorder-editor for the first time could be forgiven for thinking that this is a doubled up DR4d with extra panel space devoted to controls. They would, however, be missing the point.

While the DR8 shares and preserves much of the operational ease and control layout of what is still one of the cheapest stand-alone, 4-track, hardware-based, hard-disk systems, internally the machine is more of a downgraded and re-presented DD1500 than a souped-up DR4 (See review, July 1995, Studio Sound). Consequently, it is a mistake to judge the DR8 against the DR4 because it sports so many extra features and thoughtful inclusions in addition to the obvious difference of 8-track operation to make it a completely different machine.

Running through the DR8's features, there is a 16-channel, programmable, digital mixer to handle eight tracks from disk and eight external inputs, 18-bit, 64 times oversampled, A-D converters and 20-bit, 8-times oversampled, D-A converters. Recording is 16-bit linear PCM to up to six SCSI drives with backup to DAT. Points of note include 100 autolocate points, nine direct-access locate points, absolute and relative time modes, tempo mapping, adjustable preroll, varispeed playback, automated punch-in and punch-out, and high-quality scrub from a jog-shuttle dial for pinpointing cues from the device's various editing modes. Sampling frequency is selectable between 48kHz, 44.1kHz, 32kHz and 44.056kHz.

Connections are via balanced jacks for the eight analogue outputs (switchable in pairs for high or low gain), eight analogue inputs (switchable in pairs for high, medium and low gain) plus a main stereo output and what equates to a stereo aux send, both of which are switchable for high or low gain. There are also AES-EBU and SPDIF digital I-Os and a BNC for wordclock or video sync. Seven DR8s can be locked together for 66-track operation via rear panel, multipin, remote sockets and a forthcoming remote controller, which plugs in to the front panel.

Optional boards include a SMPTE reader-generator for time-code sync, a MIDI interface for synchronisation and MIDI control and digital EQ for the mixer. The model under scrutiny here had the SMPTE and MIDI boards fitted but no EQ or remote.

As already mentioned, the DR8 shares the excellent tape-machine-style ergonomics of the DR4. Tracks are armed individually on dedicated keys, and fast forward and rewind functions operate in Play mode for audible cueing. Dedicated keys are also provided for the To, Over and From functions. To Starts playback a preprogrammed number of seconds before the current position and stops when it reaches it; Over starts playback a preprogrammed number of seconds before the current position and stops the same amount of time after it and From starts playback at the current position and stops a preprogrammed number of seconds after it. These three functions may seem a little curious but prove indispensable for setting up things like autolocate points accurately and the altogether more important business of defining In and Out points. With this in mind, an IN TO OUT button previews the segment of audio between these two points making it easy to listen exclusively to the part you have defined. A smaller REPEAT key cycles the selected section.

Almost surprisingly, the IN and OUT setting buttons are small unimportant-looking switches given their essential role in operating the DR8. Similarly with the ENTER button: this key is pressed so many times in operation that it deserves to be larger and prominent enough to be thumped with confidence.

Locate points are accessed from the numeric keypad (some of the buttons serve as different functions keys in the Sub Menu mode) with nine single-press direct locate points and 100 others selected after three key presses. There is also a useful LAST button which can...

Less a progression from the DR4d, more a slimmed down DD1500. Zenon Schoepe finds Akai's latest disk recorder powerful and appealing.
call up the last two positions at which the stop button was pressed. Direct access to points entered as a numerical time value is also possible.

Peak hold, fluorescent light, display bar graphs cover the eight tracks and the stereo send and stereo levels. CHANNEL ON buttons select tracks for monitoring and combine with the Arming buttons to select tracks for the various editing functions. The legend below the bar graphs would benefit from being a lot brighter as the metering serves as a visual display of mix parameters (such as level, pan and aux send) for each channel.

The one-unit-high panel at the base of the DRS contains some of its most interesting features. Apart from providing gain pots for analogue inputs and a headphone socket and level control, it is here that the mix functions are accessed, In and Out points are entered. Edit mode is activated, Sync modes are set and Tempo and Beats are decided. You also access a wonderful Multiple Take section in this area.

In use

Getting around the DRS is simple and its structure in a way that does not force you to use the mixing section or the additional inputs. Like the DRd, Record mode cannot be activated from the Track Arming buttons, but once you have committed up to eight tracks simultaneously to disk you can highlight sections using the in and out point flag and assign them using the CHANNEL ON and Track Arming buttons as source and destination keys respectively to perform the various editing options.

There are cut, copy and insert, move, move and insert, erase, delete and slip functions, all of which are slick and undoable. Like the DRd, the DRS deals in butt edits. Matters are aided by high-quality scrub audio and the ability to cue and review on the FAST FORWARD and REWIND keys. To give you an idea of the speed of the machine, you can exit Record on a track and go immediately into Scrub—which impressed me.

The only thing you have to be wary of in Record is the TMRU button which routes input signals through to the main output as it will interrupt the signals that are being recorded to disk.

It would be useful and quick to be able to access the section from Play mode rather than from Stop, although I found the LAST button incredibly useful once I had trained myself to remember roughly the last two times the stop key had been pressed.

You cannot get to the submenu while recording, but this is only a hindrance when you are running close to the limits of your hard disk and could do with some indication for the time remaining.

Even so, I was surprised at just how happy the DRS is to operate on a near full memory's worth of data; there is no noticeable sluggishness when the quantity of audio starts to build up. In this area alone the DRS seems to feel a little more forgiving than the DRd.

Undoubtedly one of the best features is the Take function which allows you to store individual audio takes onto five buttons, each of which can be discarded or kept and that is in addition to the latest recording and the Undo beneath it. You can then audition at your leisure and this takes out a lot of the restriction of having only eight tracks. If you are clever and have enough free tracks available, you can write the best takes to disk, compile them up and repeat this process for further recordings. This inclusion contributes most to unlocking the power and usefulness of this machine—we are into the land of creativity here, away from tape machine analogies and into using random access to good effect. It is superb and you can also store an existing track or a combination of tracks to a Take.

Sync and backup

Synch-wise, the DRS locks reliably and varispeeds convincingly when controlled externally or internally. It takes MMC, SMPTE, MTC and MIDI clock. Those looking for an affordable and compact eight tracks of hard disk to run alongside tape with will find it transparent and fuss-free.

Eventually you will want to backup, and on the v.1.02 software of the review model, backup is total and not selective, although I understand that this will change with the latest software revision. Backup is in real time to DAT, which means that if you are in hurry then you either have to discard what you really can do without or soldier on and use your disk space as efficiently as possible. The downside of DAT-based backup is that backupable disk size could be limited by the length of DAT tape available.

There is a time display to advise you on the length of tape required to backup the disk contents but this, we are told, is approximate. Consequently running close to DAT length limits is risky if you're prepared to sit through a full disk download in real time only to find that you are a minute short on tape at the very end.

I would go so far as to say that if you have ended up with an edited stereo master, it is probably quicker to run this out digitally onto DAT in real time along with any other relevant material and be prepared to sort it all out again when you load it back in—the machine certainly edits quickly enough to make this a possibility. This sort of ingenuity will be necessary if you are dealing with big disk's worth of audio.

There is no verification procedure for the backup and to be honest, I am grateful as it would mean that the process would take even longer but backup seemed reliable and dependable.

An annoying point is that erasing a disk for the start of an all-new session defaults many values and settings which then have to be changed again. Given that these things have been set deliberately by the user, it would be handy if they could be preserved.

The Mixer seems on the face of it to be a bit of a gimmick but in reality it's quite useful. While predictably no substitute for a real desk it is convenient and relatively easy to adjust levels and pans digitally using the jog wheel inside the box—although I doubt whether I would have bothered with the EQ even if the machine had it. You can fiddle with the eight tracks of disk and eight external inputs and you automate via 99 snapshots which can be tied to time. Channels can be soloed and six tracks can be bounced down digitally and internally via the mixer and bussing sections to two other tracks.

Conclusion

It is difficult not to like the DRS because it excels in the areas you would want it to—operational ease and decent, all encompassing, editing facilities. It is fast because it is well designed, well thought out, and because it has some natty touches, like the Take function and the mixer section, that release more of its power and give you more creative control than you might expect. Backup is a bit of a problem but it always is—M-Os would be a solution but they would raise the starter price on a unit which has price competitiveness stacked heavily in its favour. If you want to integrate with tape-based systems on a stand-alone box, the DRS takes some beating. Do not confuse the horsepower of the DRS with the DRd.

Against a backdrop of large numbers of compact computer-hosted or computer-based systems the DRS proves to me that manufacturers can build hardware-oriented hard-disk systems if they have the conviction and the inclination. Akai has proved that it has and it can. I really like it.

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As computer code plays an increasing part in pro-audio, Zenon Schoepe quizzes three major manufacturers on their attitudes towards software development

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here is a popularly held belief, in these computer-driven times, that software holds the key to our destiny. While any problems with a system can be knowledgeably attributed to the software, by the same token they can also be cured by it. The promise of any amount of extended power and features can be harnessed and realised by it.

Because few operators actually understand or can fix the workings of software, it has nurtured a situation in which users have been removed from the traditional hands-on operator-equipment relationship. Consequently, software now controls machine transports, mixing console functions, PA systems and anything else that sports a screen—from the generation of music at its origin to its assembly and editing at completion. Dependence on software has reached the stage where reputations and livelihoods are staked continuously on other people’s code—despite the fact that everyone has encountered the disastrous consequences of software failure.

The word-processing package being used to compose this article is treated with respect because it has in the past lost files and corrupted disks and—as anyone who has ever spent hours reconstituting or attempting to redeem partially lost data will vouch—the feeling of frustration and isolation is made worse through an ignorance of software and the blind trust that is placed on some stranger’s ability to program carefully.

The fact that this trust persists in all of us is an indictment of human perseverance and the incredible leaps that have been made in software capability and reliability. It is all the more amazing given that most people’s first encounters with software, while exciting, are likely to have been unpleasant. The early stuff, the hardware-software combo, was unpredictable, it did move very slowly and slick was not a phrase that sprang to mind even then when we didn’t know any better. One of the most alarming things about software is that its wide-scale, or rather popular, use in audio did not take hold until relatively recently. But when it did, it pulled the computer, which has been the technological revolution, along with it into everyday use.

Mike Parker, DAR

Program code is immortalised in a product and while we can remember some pretty ugly incarnations many will be surprised to learn that high-profile products in these highly reliable times can still contain code kernels and lumps that extend back in origin over many years.

Now that we are firmly up the steep part of the software learning curve, issues arise which relate to the life expectancy of a piece of software—what influences manufacturers to take a drastic departure or subtle swerve in direction and what decides when a package gets a revision. Digital Audio Workstation manufacturers DAR have been busy rearranging how they store sound on disk in a move towards achieving their open media plans and have also achieved the transferal of their software onto cheaper platforms. MD Mike Parker believes the secret to software evolution lies with opting for a top-end operating system to begin with.

‘What made it possible was that we started off with a particular operating system which was good but normally used for controlling nuclear power stations—it’s RMX and it’s written by Intel and is real-time multitasking,’ he explains. ‘It’s a very high-end product that was originally designed only to go with their own dedicated hardware processors so the original SoundStations had a very expensive Intel processor card. Intel decided there would be a bigger market for their software operating system if they ported it and allowed it to run on standard PC hardware. We were able to port our software which is what we did when Sabre came out. In fact the reason for Sabre was that we could run our software product, which we’d invested 25 man-years in, on a PC platform and we could make a cheaper product. We had to change odd things in the software and rather than risk jeopardising our core SoundStation products we launched it on a lower-end platform until the software stabilised.

‘Since then that PC technology has gone back into SoundStations which is what all the SoundStation Pluses are all about—we’ve taken out the strange Intel processor card and put in our own lump containing the PC card and a high performance graphics processor among other things and it’s...’
Thomas Minter, Audio Precision

which are rewritten when they are no longer up to
the job or can no longer be added to in a process
Parker describes as 'continuous and on-going' with
each piece lasting around three or four years.

'We wrote some of SoundStation software in
1987 and there is probably the odd bit that is still
there like a lot of the user interface stuff—although'
we've improved the graphics the layout of the
screens was basically right to begin with,' he says.
Parker observes that many software tweaks that
come to market often have more to do with
gimmickry than core performance enhancements but
believes that despite cheaper and faster hardware
the desire to start from scratch has to be resisted.

'Ten years time the machines will probably
have different hardware and most of the software
will have changed but it won't have come about
because of a rewrite at any particular time,' he claims.
The software holds the expertise and the
experience of the users and is an evolving thing.'
Parker claims it is now a lot easier for new
companies to develop computer-based products
from ground zero by writing software on currently
available tools and he believes this is a trend that
established manufacturers are also following. 'Even
so it takes a hell of a long time to debug a piece of
software which is why you don't throw the whole
thing away and start again,' he says. 'If we were to
rewrite our software from scratch it would probably
take us 2½ years to debug it.

Charlie Steinberg, Steinberg Research

The name Steinberg has probably meant software
to more users than any other through the
company's dominance of MIDI sequencing with
generations of product that first started seriously
with Pro 16 and Pro 24 and has extended into
Cubebase with many Audio incarnations. According
to Charlie Steinberg, it's a co-MD, the only
thing that makes a piece of software obsolete is
'better' software. However, it begins the question of
how long an idea can be improved.

'Cubebase has already been going for eight years
but in a way its always different programs when it
comes to different versions—it's not just an
enhancement of features,' says Steinberg. 'The
home or pro-studio environment changes because
of software which the replacement hardware and it
changes the way of working in general.'

The limitations of computer hardware play a part,
and Steinberg agrees that software does eventually
outgrow its host—the last incarnations of Pro 16

SOFTWARE DEVELOPMENT

an upgrade we offer. He continues: 'We've been fortunate in being able to

evoe our hardware and our software together and yet give our customers a nice
smooth continuous upgrade path.'

The software is built up of a large number of
separate lumps

which you did with the previous software. There
were things in there that you couldn't view or use
all at once which you can now.

'Releasing functionality in existing equipment is
an important point because you can engineer software
for new equipment or make it

retrocompatible.' He continues: 'It opens up a
platform that meets people's expectations in terms of
tings of things like graphics but at the core of it there's
also a speed issue.'

Mintner draws a distinction between the
approaches to revisions of software only and
hard-soft manufacturers. 'For many of the software
only companies the number of versions are
sometimes improvements and sometimes partial
improvements and partial bug fixes but they
represent the only possible solution for them to
ensure a continued revenue flow,' he believes.

In some respects that has got out of hand and given
a bad name to software upgrades. On the other hand,
for hardware manufacturers and companies more

closely allied to our industry, the software is
usually part of the tool to operate hardware or to
keep track of it and there is a more total value. If
SSL or Audio Precision bring out a software update
usually it's for a pretty good reason and I don't

believe that is always the case in consumer
broad-based software.'

Mintner also addresses one of the critical issues

facing any software oriented manufacturer—the
question of how to make software development and
continued support pay for itself. 'It depends on
the structure of the product as a whole. We have
an investment in the software which helps us to sell
the hardware which is the primary revenue
stream. The software costs are hidden. For
manufacturers of relatively generic pieces of
hardware that do editing and some processing with
so many platforms out there then the strength lies
more in the software and I think that those
companies would be more aggressive in marketing the
software upgrade as a costlier option if it
indeed adds a lot of functionality.'

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bear great witness to this fact. 'There is always a limitation, the computer can never be fast enough and it can never have enough memory, that's for sure,' he asserts. 'Through the program the computer replaces additional hardware step by step and if it doesn't do that then it controls the hardware more and more. The ideal is a totally integrated studio where everything is in there but you will have to have something like 128 audio channels and all the samplers and synthesizers integrated into the computer. That's not really out of this world because the hardware currently is being enhanced so strongly that there is a horizon where this may happen in the not too distant future.'

This means that it is the programmer's delight to take any computer with increased abilities and immediately hack into it and push it to its limits. However, he acknowledges that not every computer hardware development can be chased down with software. 'I think if you look at the add-ons to a computer that make it faster then we can probably only support the ones that are most commonly used,' says Steinberg who agrees that there is risk involved. 'It's sort of reduced because the products that we write software for you can more or less rely on them happening in the marketplace but it is always a risk.'

Steinberg draws attention to the Atari Falcon computer, the responsibility for which has now been passed to software house C-Lab, as a good example. 'Atari has closed its doors and this is very hard for us but we will try and do what ever is possible now with the C-Lab Falcon. There are a lot of companies that are working with the Falcon because it is a good machine,' he observes.

Having started with MIDI sequencing and progressed to hard-disk recording and digital mixing, Steinberg maintains that it is the manufacturer's responsibility to achieve customer satisfaction by not overloading a program with too many features and ensuring that it can still be learnt quickly by a beginner. He also acknowledges that a software-based company's life-blood is its ability to evolve a product with a never-ending stream of enhancements and agrees that in addition to users who have to have the latest version there are a band of users who cut-off on software once it achieves precisely what they want and go no further.

'When I'm programming I always look at it from the point of view of the user,' says Steinberg. 'At the moment, at home I have a Falcon and I'm very satisfied and pleased with it but I'm already working on the PowerPC and an Audio version that gives you twice as many tracks and a lot of other features—and that's what I want. But if you're doing MIDI sequencing and your pleased with what you have and think you don't need anything else then you shouldn't buy anything else.'

It is an honest observation that he immediately qualifies. 'I wouldn't say that if I wasn't sure that there are people that always have to have the latest stuff.'

Adding functionality is software's goal as a glance down a list of on-paper features of the currently available DAWs reveals, yet personal preference and common sense tells us that they cannot all be the same even though they may seem it.

As computers play an ever more important part in our lives so software will exert its irresistible influence on how we work and how we think. Faced with upgrade and update routes that are potentially infinite perhaps we should draw from the experiences from the early days of software when getting it to work reliably and getting it to do what was wanted was all that was expected.

If there is a lesson to be learnt it is that more realistic and practical expectations should be made of software. It exists to enable a genuinely useful function to be performed in a manner that is faster and more convenient than what it replaces. Techno-fust is a frightening thing yet software is its natural habitat. It does not control our destiny so much as we control its.
Reflecting the Future

Adrian Kerridge, Philip Vaughan and David Ward are all part of a new look APRS Show—Audio Technology 95. It takes place next month and represents the fruition of a fresh approach.

The fact that the APRS exhibition has the longest and most illustrious history of any pro-audio event on the planet is not something you will get APRS chief executive Philip Vaughan to dwell on for too long. To him the fact that the Association was formed in 1947, became a limited company in 1951, and held its first exhibition in 1968 as an adjunct to its Annual General Meeting where a few manufacturers laid out their latest gear on green baize-covered tables, is of historical interest but not the major factor. To Vaughan what has happened since and what is happening this year in particular is far and away more pertinent. The APRS show is relaunching as Audio Technology 95 as a positive move to better reflect the changing nature and content of the industry it represents and serves. 'We are continually regenerating,' says Vaughan. 'We have a board of directors which is always open to new people. The show regenerates itself every year and it has relaunched itself with a new title. The make-up of membership is always evolving. We have been around for a long time but we are not now what we were when we started and there is a lot of internal dynamism to keep this renewal process going.'

For Vaughan, this year will be a milestone exhibition captured succinctly in its new name. 'It's exactly a reflection of the change that has been growing over perhaps five years,' he explains. 'It was time for a relaunch and with it an opportunity to put together a slogan to demonstrate what our exhibition truly represents right now. Yes, the APRS show of one upon a time was the show for people who bought gear for big recording studios the days when the initials APRS included an 'S' for Studios. That name changed some years ago, 'S' now stands for Services, and the show has also become much wider and what it is really about is audio technology.'

To coincide with this, for the first time in very many years the exhibition will be held entirely on the single floor of the National Hall at Olympia, London. 'Those exhibitors who have been to AES shows on the continent will be able to contrast the nightmare of a conference centre that's adaptable for an exhibition venue as opposed to the one big lofty hall, all on one level, such as the AES Amsterdam,' says Vaughan. 'Against that sort of background people will appreciate Audio Technology 95.'

Last year's highly successful Briefings sessions are here to stay with a markedly high profile, as Vaughan explains. 'Because we are a trade association and not a learned society we only concern ourselves with what is practicable, on the market now, what is happening now, and how to make the most of it. The style of these Briefings is deliberately different from any Conventions, such as AES or IBC because they tend to be less formal and certainly more down to earth in terms of practical application. The existence of the Briefings and the content of the programme reflects the changing nature of the recording business.'

These three major changes combine to place a different complexion on the exhibition which Vaughan believes has been brought about in response to what the exhibitors and attendees want. 'The days when the show existed as a medium in which manufacturers of kit that was bought by professional studios was the core, have gone forever,' he claims. 'Because of that we welcomed people from a number of associated fields and it's a matter of fact that over the last five years there have been a substantial number of exhibitors from the sectors of broadcasting, sound for radio and TV, live sound, theatre sound and, in the last two or three years, project studios. We have been happy to push that aspect and exhibitors have been very glad to mat their full range of products available.'

Promotion of Audio Technology 95 will be carried in the broadcast, project studio and live sound press and visitors are expected from as far afield as Japan, Australia, South Africa, America and throughout Europe—not in numbers that overshadow the UK attendance but in numbers that nevertheless qualify the show's international status. 'It's a show that is as significant internationally as the UK music industry,' states Vaughan.

Consequently, he dismisses the claims made by critics of the show who accuse it of entertaining a high proportion of 'tyre kickers' and finds it an unusual attitude to be found in an industry that has its origins far removed from re-suited serious-looking folk. 'By 'tyre kickers' they presumably mean those who don't actually have a cheque book in their pockets or don't look as if they're ever likely to be able to have one,' laughs Vaughan. 'In the music business you certainly cannot tell if the guy with holes in the back of his jeans isn't actually somebody quite competent to order some exciting equipment or to influence other people. A group with an advance to spend are certainly not going to walk around in suits.'

'If an exhibitor has done the job of receiving those people properly on his stand, explaining the benefits and advantages of his equipment, taking them at face value as informed professional attendees at a technical trade show, he can't go wrong,' he continues. 'And if these 'tyre kickers' aren't really buyers in disguise they may be youngsters who will be buyers in the future and if they've been received properly they are bound to think better of that company.'

With the rebirth of the APRS show as Audio Technology 95, the Association's Chief Executive sees an assured future for the event as it continues to major on
A positive response

New APRS Chairman Adrian Kerridge reveals he’ll be approaching his three-year tenure with the same 'hands on' interaction that has marked out his successful professional career

Kerridge believes that the APRS does respond positively to requests and he is adamant that it is something it must continue to do. In a letter to each member in March he asked them to take the time to identify three issues that they consider important to their business and to the well being of the industry, and he encouraged any other comments and suggestions. He is taking the game to the members and he wants a reaction.

"One of the points that comes out time and time again is the prospect of the downwards spiral of rate cutting," explains Kerridge. "In a competitive world rate cutting will go on and I see the APRS’ task is to encourage our studios to communicate with their clients. When you have rate cutting clients can’t always differentiate, and I say this with respect for the client, between different studios whereas we know that there are various classes of studio.

"All the things like return on investment, staffing levels, maintenance levels, the whole area, is communication and education," he continues. "The UK Studio Accord has put together some good ideas in terms of setting standards for what you would expect from an Accord member studio which then filters through to the other studios. It’s about encouraging others to improve standards and to be professional all the way through."

Kerridge, who was appointed Chairman at the beginning of January, describes the task as ‘daunting’ but says he is supported by the tremendous team of a highly professional and motivated board. He sees his role as ‘three years of interaction with the..."
membership'. The structure of board meetings has been changed so office 'routines' can be got out of the way fairly quickly leaving more time to focus on industry topics and problems.

He is clearly not a bureaucrat. 'The phone is here, I'm always here, and if any member wants to talk to me they call me up, it's as simple as that,' he says. 'If I can't give the answer then we'll get somebody else who can and we'll get back to them—try me guys!'

As director of CTS and Lansdowne Studios in London his association with the APRS goes back to the late-1960s but most recently he has been Chairman of the Administration, Finance and Legal Committee. Fiercely proud of the British pro-audio industry and a major player in its recording business, to many he typifies the sort of studio businessman that the UK is so good at producing.

'I'm still a practising engineer, I live with clients at the sharp end,' he states. 'I live with equipment and I get to know the warts-and-all of everything but equally I have to run a professional organisation that makes money for its shareholders.

'When a client walks out through any APRS studio's door they've got to be happy in every respect. Did they have a good time, did they get what they required, did all the equipment work?' He claims that repeat business is the mark of client satisfaction. 'We get repeat business and yes, I am a businessman in that sense but I've come through the whole school.' He adds that professionalism is the right of any APRS studio.

'It's a people business—they take care of their clients and it's what makes it all happen,' explains Kerridge. 'Each of these studios have their own level of professionalism but it's a difficult word to define. If you talk about unprofessionalism then that's the lack of technical expertise, technical knowledge and technical backup, it's purchasing the wrong type of equipment for short-term gain, it's about not making enough money to reinvest in equipment.

'I believe it is the APRS' duty to its members to look after them and to give them the best advice available in all aspects of business and technical issues,' he adds quoting the example of a call he received from a mastering house that had been experiencing PQ encoding shifts on various media.

'I spoke to some other guys who had been having the same problems and we immediately set up a working party to address mastering standards under the chairmanship of Bill Foster,' recounts Kerridge. 'It's an enormous task but I believe if we get the heavyweights together to try and formalise something so that everybody, including the manufacturers, know where they're going, at the end of it the APRS will be able to set out guidelines in mastering standards. Like we did with the Tape Labelling system which works extremely well; the labelling of DAT masters is not working too well in practice, but we'll address that too.'

Among the most recent—some would say most surprising—changes is the inclusion of project studios within the APRS membership categories. 'I don't have an attitude problem with any of that,' states Kerridge. 'In America there's been this paranoia about main studios going out of business because of project studios but I don't believe that's the case. There are project studios that artists have to do their own work in to a certain level and standard. Why shouldn't they? Eventually they'll have to come out and overlay other musicians or mix and hopefully they'll come to APRS member studios for that.

'The problems arise with some non-APRS studios that advertise themselves and operate, as what I would describe, as cowboys. There's no planning permission, no fire regulations, no indemnity insurance, or public liability insurance. These studios could be a danger to the artists that work in them.' He continues: 'They should be encouraged to operate in a correct manner but some of them are very successful and our members say this is not a level playing field and they're quite right. There's not a lot we can do about it beyond continuing to recommend our customers to be very careful who they do business with—buyer beware!'

Kerridge believes that the APRS is fortunate to have highly active groups within it such as the Studio Accord, Repro, the PAD group and the Suppliers group, all of which work in their own areas, but he does not see the Association's role to be that of an audio policeman: 'Policeman is too strong a word—adviser is better,' he comments. 'Some manufacturers over the years have released equipment that has been technology-driven prior to the technology being up to speed and running, and guys have bought it and it's been terrible. I think the APRS should look at that area and work with manufacturers.' He believes that equipment should be properly beta-tested before it is released on the open market and that the APRS could keep a watching brief over this as it does in other areas already.

'We have credit circles where there's a watching brief over who pays who and who doesn't—there's the studio credit circle with PAD and there's the manufacturing credit circle,' he states. 'We know who they are and they know that we know. It's a self-regulating device and I believe we could apply something like that to new technology. Let's work together with the manufacturers.

'There's also been a feeling among some members for some time that we've been driven by manufacturers telling us what we want. That's changing because we now want to tell them what we want,' adds Kerridge harking back to the early pro-audio days, when this was in fact the norm.

Above all else he feels passionately that the UK industry should not lose sight of its heritage and its primary purpose of capturing audio for posterity and he sees the APRS, which he says is run professionally and democratically, playing its part. 'I'm proud of that and these are exciting times,' he enthuses. 'Members have groans, moans, complaints but there's the phone, pick it up and we will address it. We can't be all things to all men but what we can do is recognise the change in the exhibition, the technological changes, and we must never overlook the artistic changes that are derived from the technology.

'For my money, we have the finest musicians in the world in this country and we still lead the way with the Americans although they still look to the British for all that history that started here decades ago. We must never lose that,' he states. 'The talent of engineers we have is enormous. We in the APRS must recognise that and drive forward and be active with all these people.'
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The Briefings

SEMINAR ROOM 1

WEDNESDAY, 21st JUNE

11.00–12.00 Equipping a professional project studio. Sound On Sound magazine's David Mellor explores the choices available and explains how to get the best out of your hard earned investment.

13.00–14.00 Media issues relating to modular digital multitrack. Presented by John Osterling of Ampex.

15.00–16.00 The Mix magazine production workshop.


THURSDAY, 22nd JUNE

13.00–14.00 The Mix magazine production workshop.

15.00–16.00 Getting away from presets. Sound On Sound's Martin Russ reveals quick and easy ways of customising preset sounds and shows how to harness the power of hard-disk recorders.

17.00–18.00 EMI talk about their new factory for CD manufacture.

FRIDAY, 23rd JUNE

11.00–12.00 The PA Forum—problems of PAs in small venues. Plasa, Lighting and Sound magazine and Dave Ward of Gateway lead a panel of experts in throwing some light on problems and questions.

13.00–14.00 Integrating hard-disk recorders with the project studio. Sound On Sound's David Mellor explores the creative potential of nonlinear systems and shows how to harness the power of hard-disk recorders.

15.00–16.00 The Mix production workshop.

17.00–18.00 Andrew Bruce of Autograph reveals the secrets of the Meyer System for acoustic environments.

SEMINAR ROOM 2

WEDNESDAY, 21st JUNE

10.30–11.30 Pioneering automation systems in the theatre. Sound and Theatre Designer John Leonard demonstrates his work and looks into the future.


THURSDAY, 22nd JUNE

10.30–13.00 Multimedia. Tim Frost of Data Production International pulls the lid off the expanding world of multimedia and discusses its relevance to the recording industry. Andy Berezka spills the beans in a practical demonstration on how a multimedia package is put together.

14.00–15.00 ISRC: How to get paid. An introduction to ISRC and ISRC data collection presented by Peter Fileul of Repro.

16.00–18.00 ISDN. Dolby's Andy Day and consultant Bill Foster offer an update on ISDN applications and link up live for breakfast with America.

FRIDAY, 23 JUNE


12.30–13.30 John Wykes of radio-microphone systems manufacturers Micron analyses the pros and cons of working with radio mics.

15.30–16.30 Detlef Wiese of CCS talks about the increasing use of audio compression, in particular ISO MPEG Layer 2 (Musciam), in broadcasting, recording studios and telecommunications.


Briefings build on success of year one

Briefings' organiser Dave Ward outlines the cross-market appeal of three days of seminars and their importance for concentrating the mind on the value of training

Last year was significant for the APRS Show as it saw the debut of the Briefings sessions—informal seminars covering a wide range of topics and reflecting the broader scope and appeal of the exhibition. It marked something of a departure for the world's longest established pro-audio event and, while its organisers will now admit a degree of trepidation in that first year, it was indeed a resounding success with staggering levels of attendance and interest.

The Briefings at this year's Audio Technology 95 will again be handing on knowledge to users of all standards but in bigger rooms and through a busier programme and with the same theme of cross-sectional subject matter and expert industry presenters. Areas covered include: production workshops; project studios; talking book production; media issues in modular digital multitrack; synthesiser programming; CD manufacture; theatre sound and automation; multimedia; royalties payment; ISDN; synchronisation and machine control; radio mics and data compression.

Organiser Dave Ward, from the UK's Gateway Studios, says the purpose behind the Briefings was to add value to the exhibition and serve the need for information-giving forums by all sides and to all areas of the industry.

The scale of this year's sessions may be grander and more ambitious but the initial intentions and concepts have been preserved. 'It's not intended to be a learned paper programme,' explains Ward. 'AES do that extremely well—it should be information giving, sharp and zappy, but not a manufacturers' sales pitch either.'

This year's Briefings is a bit bigger. We have bigger rooms and we can now make some noise,' he adds. This last point is a pertinent one as last year's Briefings were held on the exhibition floor with interference caused by the exhibition itself, particularly as more people wanted to attend than there was space for. The move to the National Hall at Olympia for Audio Technology 95 has opened access to the large balcony area above the main floor with two rooms of this dedicated to the Briefings.

Room 1 is the larger of the two and will host presentations aimed predominantly, although not exclusively, at the project studio with Room 2 taking care of the remaining fields. Ward admits he wasn't surprised by the high attendance at project studio Briefings last year as it has become the area of intense activity for many manufacturers.

'There was a lot of interest last year in the live sound side, particularly on a session 1 did on gain structures, so we've put a panel of people together with Plasa who were very keen to support what we're doing to answer questions from live-sound people and especially those who work with small systems in small venues.'

Every Briefing is a highlight in its own right according to Ward and notable speakers include John Watkins, Andrew Bruce, Andy Berezka, Tim Frost, and David Mellor. 'I've tried to make them all unmissable in their own particular areas,' claims Ward. 'If we take Wednesday, John Leonard is doing his bit for theatre sound designers, then there's the hard disk area with Trevor Duplock and then a broadcast forum so we're looking at all sectors of the industry.'

Predicatably, hard-disk recording is well represented. 'They're going into nearly all pro studios and project studios and hard disk is now everywhere. All the multimedia work coming along is where it's at and it's why we've got Andy Berezka and Tim Frost in now to update everybody on what has happened since last year,' he says. 'The studio people have got to learn a little bit about other people's professions.'

Production workshops by The Mix magazine will follow last year's formula of bringing in producers with tapes to demonstrate their approach to mixing. Ward believes that the Audio Technology 95 Briefings are a rare opportunity in the UK for people to get involved on this sort of level and he sees it as manifestation of the APRS playing its part in education and training in the industry. Ward says that announcements will soon be made which will see the Association having even greater involvement.

'These areas are the most crucial for the industry particularly in view of the power of the new National Curriculum for music where music technology, information technology and recording technology will play a big part,' he observes. 'This can't be ignored, we have to look at it.'

According to Ward, it's not just about raising and maintaining standards. 'We have to separate training issues and education issues,' he says. 'Training issues are to do with raising competence and awareness in the industry, education is to do with issues around what is happening in schools with the National Curriculum for music and how our industry can help with that. We are the only people to do it, we're the people with the knowledge and we should be doing it and being seen to be doing it.'

'We're talking about musically educating tomorrow's customers for the manufacturers and the studios,' he adds.

Briefings' organiser Dave Ward

58 Studio Sound, May 1995

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We are setting standards
Attracting serious attention at the recent NAB 95 Convention was Studer Editech’s Integrated Postproduction Studio Console. James Douglas looks in depth at the Post Trio system.

Over the past several years, Studer Editech have been continuously refining and enhancing the popular Dyaxis series of Digital Audio Workstations, culminating in what I would consider to be a very powerful, fully-integrated system for film and video postproduction. The new Dyaxis Post Trio is comprised of a collection of modular sub-units that are integrated into a stand-alone system that provides full waveform editing, mixing and signal processing. In addition, the firm’s new VideoMix Digital Video Recorder provides full-speed, full-motion, synchronous picture playback from hard disk, a development that dramatically reduces spooling and rewind time; now any segment of video can be accessed in literally the time it take to press a button.

Post Trio is centred around the new Dyaxis IIi InterMix processor, which represents a complete redesign of Studer Editech’s proprietary nonlinear editing engine. At the heart of Dyaxis IIi’s expandable design is a high-speed, 128-channel TDM (Time-Domain Multiplexed) back-plane architecture. Each IIi processor provides eight channels of disk recording and 16 channels of real-time playback; virtual mixing enables playback of an unlimited number of tracks, which in reality is restricted only by the amount of available disk space. Any input can be freely routed to any disk channel or mixer via the InterMix TDM-based network; MultiMix v2.30 software provides visual display and control of all mixing, EQ and signal-processing functions.

Using up to three Dyaxis IIi chassis connected to a single Macintosh II-PowerPC graphics controller, Post Trio systems can provide either 8, 16 or 24 disk channels, with simultaneous record and playback; between 16 and 72 I-O ports for signal processing and I-O; and between 14 and 32 summing buses that can be dynamically assigned for recording, mixing, auxiliary sends and monitoring. The new II system is fully compatible with existing Dyaxis II file formats and Plug and Play M-O media.

One very neat feature of the new system is the fact that you can simultaneously play and record on each of the Dyaxis IIi’s disk channels. So, during punch-in and punch-out sequences, as I discovered, it is possible to monitor the end result directly, without having to roll back and review the punch. A great time saver during music, ADR, Foley and other functions. It is also possible to layer multiple recordings onto a single track during, for example, ADR or voice-over sessions, as the actor tries a series of different reads—and then edit and-or modify each layer independently. And with access...
to an unlimited number of Virtual Disk Tracks and no edit density restrictions, it is possible to quickly zero in and modify any ingredient during any phase of a project—even during a final mixdown of edited sound elements.

**VideoMix**

In terms of editing and mixing sound to picture, Studer Edittech's remarkable VideoMix provides a cost-effective alternative to slower video-cassette or even laserdisc transports. Available as an option, VideoMix features digital playback of QuickTime-format video, fully-synchronised with Dyaxis video, and includes a comprehensive audio and video scrubbing. The system provides field-accurate display in pause mode, genlock to external sync capability, PAL and NTSC support (50-60 field), plus full-frame playback (768 x 576 pixels for PAL and 640 x 480 for NTSC) on a dedicated monitor. Based around the well-established Radius VideoVision Studio system, which includes a NuBus card and a video breakout-interface unit, VideoMix provides 2Gb of high-speed, A/V specification Micropolis hard-disk storage as standard. This capacity offers up to 60 minutes of draft-quality playback, 15 minutes of reference/S-VHS quality, or five minutes of on-line/D1-quality video playback. (Larger, 4Gb capacities and multiple drives are also available as a system option.)

From my evaluations with both draft-quality and reference-quality QuickTime video playback, the system is more than adequate for just about any postproduction assignment; video loop and scrub editing is extremely precise, repeatable and, above all, accurate. Studer Edittech quote a tolerance of better than 0.25 video frames; during my evaluations it was possible to nudge picture and audio in single-frame increments, which proved more than sufficient for precisely locating edits to on-scene action, of for tagging EQ changes, for example, to specific locations. (It should also be pointed out that the firm's engineers have hot-rolled the basic QuickTime system extensions provide by Apple, and squeezed far better playback quality than is available from the standard configuration; I'm not sure exactly how they did it, but certainly applauded the results.)

Because of the data-processing throughput required by VideoMix, Studer Edittech specify the use of an Apple Macintosh PowerPC 6100 or better as a mainframe computer-plus an interface, plus a minimum of 16Mb of system memory. Bundled with VideoMix is Adobe's premiere video production and editing software. Also provided is a Subtitling Function, which allows captions and other information to be superimposed on the video signal (and which is therefore appropriate for QuickTime-equipped systems). Typical applications might include conventional subtitling for ADR or Foley sessions, as well as voice-over and related operations.

And if your needs do not run to disk-based video storage and replay, Post Trio also features conventional nine-pin serial control for conventional audio and video transports (supporting P2, TimeLine Lynx, Studer ES.Bus, Tascam DA 88, SV-3000 and ASC Virtual Recorder protocols); LTC and VTC time code at all popular frame and field rates is also featured.

A separate dynamics section provided with the MultiMix software offers a compressor, gate and expander section that can be assigned to any input, playback channel or output bus; a 'pool' of summing buses can be dynamically accessed as required for recording, aux-cue sends, mixing, monitoring, and solo operations.

**System components**

The new Post Trio system adds a set of dedicated hardware controllers and user interfaces to the Dyaxis III, which enables an operator to take full advantage of the post-production editing, mixing and DSP functions. Located above the operator's central position at the ASCII keyboard is a 16-channel metering panel, complete with peakhold and related functions. The MultiMeter panel follows the system's source switching—either on disk output, disk playback, or 8-channel systems. Channels 9-16 follow aux output levels. Since it functions independently of MultiMix software, the metering panel allows visual displays of output levels, for example, regardless of how the main Dyaxis display screens has been configured.

To the immediate left of the keyboard and metering is the Post Trio's Mixer Panel, which comprises a bank of assignable channel faders equipped with moving-fader elements; a bright VFL (vacuum-florescent) display located at the top of the fader bank is used for switching I-O sources, and for controlling the system's built-in EQ and DSP functions. Post Trio's integrated mixing capabilities provides the user with two assignable automated mixer strips per disk channel. During recording, one strip might be used to control input levels to the system, while the other provides monitoring of disk playback levels. During a mix session, all the extra strips are available to mix inputs from external signals, such as effect units, laugh tracks, etc. All mixer strips feature input trim, a servo-controlled fader, 4-band parametric EQ, full dynamic functions, six pre-toaux sends, pre-post inserts, pre-post fader listen, and destructive solo-in-place. In addition, all sources can be panned across up to eight main output buses using an on-screen MultiPan joy stick.

The Mixer Panel handles assignable control and mixer automation for up to 24 channels of Dyaxis III playback, any physical fader can be mapped to any input or output channel physically located in up to three processor units. Nine moving faders are provided: eight assignable channel plus an overall stereo master. The upper VFL display features four assignable knobs and 14 soft switches that provide control of pan, EQ, trim, channel assignment as well as setup parameters. Channel EQ and automation status, plus SOLO-MUTE buttons, are provided on each channel and the master strip. All faders, pans, mutes, and bus assignments are dynamically automated via moving faders, buttons, and knobs. EQ and trim controls may be memorised and recalled via assignable automation. System setup and control is a breeze.

To the right of the desk is located the Edit Panel, which handles transport, editing, and machine control. Buttons are arranged in groups associated with specific functions, including transport control, cursor control, edit trim, fader control, edit functions, time-code functions, and machine control. Associated with the transport section is a scrub-shuttle wheel that can be used for rapidly scanning through a sound, and also for performing precise trim functions. A track ball is also included on the Edit Panel for both controlling point-and-click functions for the MultiMix software.

Dyaxis will read a variety of sound-file formats, including MultiMix, MacMix, Native OMF, AIFF, Sound Designer II (SID) and Lightworks. A number of Edit Decision List formats can be imported into Post Trio, including OMF Recipes, CMX, Grass Valley Group, SMPTPE and Lar tec, enabling autoconform and other functions to be activated against time-code designations from an external EDL.

To the extreme right of the control desk is the StudioPak section that provides control-room monitoring, studio playback monitoring and cue-foldback controls, as well as headphone monitoring, studio talkback and slate. A custom MIDI interface between the outboard StudioPak Processor and master Dyaxis III rack(s) provides both I-O routing and level control. The processor features seven, stereo, analogue inputs, with connections to multiple headphones and loudspeaker outputs. While all of these functions could be achieved via, for example, a separate switch box, integrating them within the Post Trio control surface means that they can all be controlled and implemented from the user's position, without reaching for a separate knob or switch.

A pair of 20-inch monitors are recommended for the Post Trio system: one to display the conventional View and Edit Panels associated with the Dyaxis MultiMix editor, and the other for graphic representation of the system's Mix Panels.

A "starter" Post Trio features eight channels of simultaneous hard-disk record-playback, 16 assignable mixer strips, plus 12 analogue inputs and outputs and 12 digital inputs and outputs. Physical connections to and from the system are provided on the rear panel of each Dyaxis II module; XLRs handle time code, analogue I-Os and digital I-Os (the latter can be selected between SPDIF, AES-EBU, Yamaha Y2 and other popular formats); RCA phono ports carry consumer-format SPDIF digital I-O; BNCs carry video sync, word clock and similar signals; various D-Sub ports link multiple processors and control of external video and audio transports.

**In use**

Space prevents coverage of more than some of the basic functions offered by the new Post Trio system; suffice it to say that a combination of the new, dramatically enhanced Dyaxis III processor, with its powerful editing, mixing and processing capabilities, plus an assignable control surface with moving faders, helps streamline the myriad functions required during film and video postproduction.

While performing complex cut-and-paste editing, the Edit Panel handles transport, editing, crossfade and machine-control functions. The→
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scrub-shuttle wheel provides real-time control of transport functions, as well as edit trim. Scrub edit is precise and very easy to use; once audio and video are locked together they stay in accurate sync as you move backwards and forwards through the edit location, which can then be marked with a single keystroke. To avoid unnecessary clutter, buttons are arranged in groups that correspond to specific system functions, including cursor control, edit trim, fade-crossfade control and edit profiles. The central QWERTY keyboard is used to label mixes and handle other system functions.

The Mixer Panel, which handles control and mixer automation for up to 24 assignable channels of source or hard disk playback, is elegance personified. The mixer section is clearly laid out and easy to use, and functions just like a normal console, complete with the familiar safe-ready, input-tape and related functions. Located directly above each channel's fader are a series of buttons that control input-replay, solo, EQ in-out, mute and automation functions for that channel. On aspect of Post Trio's design approach should not be overlooked. Since the various mixing and editing functions are fully integrated, EDL information does not have to be exported to a separate mixing console. In addition, edit changes are automatically captured by the Dyaxis software, along with any level, EQ and DSP modifications.

The moving-fader automation is based on an OEM version of Audimation Systems' UpToam Series fader elements and master processor. Internally, the various level, mute and solo control functions are linked to the MultiMix software which, in turn, provides dynamic storage and recall of channel settings against time code. Fully integrating the mixing and editing functions within a single control surface allows the operator to develop some serious speed, if only because all controls fall easily to hand: control of the assignable eight channel-and-master faders soon becomes intuitive, as you bank-switch among the various I-Os and disk channels being used at a particular stage of the session.

After a few minutes, you forget that the controller is connected to a hard disk workstation, and use the mixer in a conventional manner, complete with assignable EQ, level trim and output pan controls, plus the moving-fader automation functions. Edit is be made freely across the available picture, track, housekeeping functions, continuously monitor the amount of disk access that will be needed to replay the current number of tracks. If these fall beyond the physical capabilities of the system—and which depends upon the type of media being used (either Winchester or Magnetooptical)—some form of AC-2 data compression—then the MultiMix software will perform an automatic mixdown of the high-density, disk-intensive sections. It usually takes just a couple of seconds for the Dyaxis III to take care of business. It's a function that seldom, if ever, gets in your way during even the most complex sweetening and editing sessions.

Above the bank of faders, an array of four assignable knobs and shaft encoders plus software-defined switches allow pan levels, EQ, trim, channel assignment setups to be altered and remembered. A VFL panel displays corresponding channel, EQ values and automation status. The Dyaxis parametric EQ section is very powerful and sounds good. The EQ page displayed on the VFL panel shows the type of EQ profile applied to the input or disk track—band-pass, low-pass or high-pass—plus the center frequency, gain adjustment and bandwidth-Q setting for each of the four bands. Settings can be labelled and stored to disk, for subsequent recall and re-assignment to other sound cues. The Mix page shows the names of the eight currently accessed fader channels, with pan, input source selection (analog or digital mix output), plus automation assignments.

Although the display window is small, it is clear in its layout and easy to follow. But remember that all system information is also displayed on one of the colour VDUs, which can be set up to show, for example, a real-time graphic representation of a parametric equalisation profile, or dynamic level envelope.

The Edit panel, as might be expected, dramatically streamlines the editing process. A dedicated scrub-shuttle wheel allows edit markers to be located very easily—one revolution equates to one second of audio. While trimming and/or refining the selected edit point without audio playback, resolution of the wheel is magnified by a factor of 10. It is no exaggeration to say that the scrub-shuttle wheel enables rock-and-roll/scrub editing as easily as conventional analogue techniques—with enhanced resolution and outstanding precision.

As will be appreciated by current users of harddisk editing and mixing systems, on-screen graphics and the location of Now Lines and Replay Cursors are of crucial importance. While normal playback occurs between the left and right cursors, MultiMix always places the Now Line at the left cursor, unless you're playing, paused, or scrubbing the free cursor. Each of these various interlinked functions—dependent upon whether an In or Out-point is being refined, for example, or you are simply listening through a section—has been mapped to dedicated keys. By default, transport control mode is for the system to replay what has been marked for editing by the left and right cursors in both of the MultiMix Source and Destination areas.

Once these design topologies have been absorbed, however, running MultiMix is extremely simple and very straightforward. All of which greatly speeds up a typical editing session and, once mastered, makes operating the system a real snap.

Dedicated buttons are provided for a number of functions, including SYNC, CUE, SPLIT, BPM, PASTE, PUNCH, PASTE, INSERT, ZOOM IN AND OUT. Cursor Block controls move the cursors, as well as performing audition and trim functions on the left, right or both cursors. Particularly handy are the AUDITION/TRIM UP TO LEFT and related buttons, which cause MultiMix to play up to or from the left-right cursors and then stop. Double pressing the button will loop audition the operation, enabling fine trim of the cursor position with the scrub wheel, or using the left and right keyboard arrows to trim by a predefined amount. A related section provides edit-based (splice) and event-based audition, plus trim functions. Having selected a splice or event, the outgoing or incoming audio of the selected splice can be replayed; alternatively, the Event In or Out section can be replayed or looped.

Six preset fades and crossfade profiles can be user-assigned to a series of dedicated buttons, and pasted onto selected cues in the graphic EDL window. Fade time assigned to these buttons can be labelled with H.M.S values, as well as a contour value (attenuation in dB at the fade's centre).

SET LEFT:LEFT RIGHTS, as well as capture and goto buttons, function exactly like those on the MultiMix screen. SET LEFT changes the cursor's time-code value to the value stored in the time-code buffer without moving it; the same operation can be performed on the right cursor.

All in all, the Studer Editech Post Trio offers one of the most intuitive, easy-to-finish editing, mixing and processing systems I have used. The integrated user interface offers an excellent compromise between too few and too many controls. A large console section takes up a lot of space, and often gets in the way during an editing session. Full dynamic automation of every level, mute, pan, EQ and dynamics function means that a complex mix can be built up in sections, with some functions being assigned to panel controls as you proceed with the mix session. And should you become stuck at any time, the Dyaxis III instruction manual is comprehensive, and well illustrated.

The Dyaxis Post Trio Integrated Postproduction Studio Console is well thought out and engineered, and offers an excellent balance between a virtual and physical work surface. It will dramatically simplify and streamline a great number audio production tasks.

Conclusion

The Post Trio is available in three configurations: 8:16:24, 16:32:40 and 24:48:56, with the numerical suffix referring to Disk Channels: Mixer strips: Analogue and Digital I-O ports. (For example, a Post Trio 8:16:24 features eight channels of simultaneous record to and playback from disk; 16 assignable mixer strips; 12 analogue inputs and outputs plus 12 digital inputs and outputs.) The Post Trio 8:16:24 costs $84k, complete with two, 1Gb removable drives (six-track-hours of linear recording); Post Trio 16:32:40 is $132k, complete with four, 1Gb removable drives; and Post Trio 24:48:56 is $177k, complete with six, 1Gb removable drives. The MultiMix is an additional $12.5k. Other system options include Dolby AC-2, 4:1 digital data compression; an I-O expansion unit (0:0:8): 3/4-inch M Plug-and-Play drives with AC-2; 5/4-inch Extended M Plug-and-Play drives; Data-DAT 4mm or Exabyte 8mm backup drives. All costs quoted in US dollars and do not include the Macintosh graphics controller.

Studer Editech Corporation, 1370 Willow Road, Menlo Park, CA 94025, USA. Tel: +1 415 326 7030, Fax: +1 415 326 7039. UK: Tel: +44 1707 665000, Fax: +44 1707 665723. Switzerland: Tel: +41 81 730 75 11. Fax: +41 800 47 37. Japan: Tel: +81 3 3465 2211.
Spectrum Organ contains 128 presets including classic rock, jazz, gospel, and pipe organ sounds. Each preset includes individual tonal, distortion, reverb, and bass line settings. These settings can be globally altered from the front panel, or without MIDI controller messages. In addition, each preset contains four drawbar waves which can be accessed in real time using the PC-1600 MIDI controller.

Spectrum Synth contains 256 (64 RAM/160/32) classic synthesizer presets including analog, digital, and hybrid sounds. All filters are dynamic resenonant filters, which can be edited at all times, even in real-time, to create new sounds. The Spectrum Synth includes classical piano and synthesizer sounds, as well as 1600 programming and controlling options. MIDI presets can be edited and saved to RAM locations using the PC-1600 MIDI controller.

Spectrum Bass contains 200 presets including classic analog and digital synthesized bass, as well as electric, acoustic, electric, and acoustic bass sounds. The Spectrum Bass includes sustain, and key note sounds. A MIDI controller allows settings to be stored in memory.

Spectrum Analog Filter is a true programmable analog filter system which can be used to process any sound. It offers 12-channel input filter, an input-controlled resonance, poly, and stereo sounds. The Spectrum Analog Filter includes internal and external sounds, as well as MIDI controllable. The filter circuit includes an APER envelope, which is key sync controlled, and is MIDI controllable. The Spectrum Analog Filter also offers an ADSR envelope and mastering. 100 preset envelopes allow settings to be stored in memory.

PC-1600 MIDI Controller This general purpose 163 controller offers 13 sliders and 6 buttons that can be programmed to send system common or system specific messages. In addition, 2 CV inputs and a data wheel can be used as interface controllers. The PC-1600 has many data-modulating, choreographing, and controlling any of the Spectrum series sound modules. The PC-1600 can also be used as a system of using the sound of a controller. MIDI receive controller, lighting system controller, etc. All presets are fully-programmable, so other new sounds develop, they can be programmed by the user easily.

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Nearly everyone in the world today would recognize O J Simpson as a result of his public trial. Less well recognised, though, is the problem of preserving aural evidence from the trial—a problem shared by the world’s recording and studio communities.

It is revealing to note that multitrack tape still stores the majority of masters from recording sessions—both in the analogue and digital domains. But other formats are coming through and tape’s habit of shedding oxide begs that a more reliable medium be found. For the purposes of this discussion, let us consider archival storage of recorded audio to be beyond ten years, with 25 years as ideal.

All of the following formats are acceptable for short and medium-term storage. Their relative suitability, or otherwise, for archival storage is the issue in question. Vinyl LPs are remarkably stable but potentially fragile and good for only one pass without introducing groove distortions. They are, however, potentially easier to handle, eliminating many possible downsides.

Analogue/digital multitrack tape is subject to manageable audio problems of crosstalk, demagnetisation, noise, and corruption while in storage and so on. Its major shortcoming is mechanical degradation of the tape itself due to the separation of the plastic acetate or polyester backing from the magnetic coating. Not all tape sheaths, but not knowing whether or not you have an archival ‘time bomb’ is not comforting.

DAT tape has seen growing use in the recording studio community for 2-track digital recording. The downside archivally is the relatively inconsistent playback from machine to machine. Many feel that to successfully archive DAT tapes, one would have to archive the DAT machine that made them.

U-matic tape is a 20-year old technology still much used for CD mastering. Its medium-term reliability is shown by TV news use, but long-term availability of new machines seems in doubt as newer technologies replace it.

Use of 8mm videotape as a digital multitrack format raises the same questions as for the above two TV VCR-derived technologies. Again the long-term question mark is a problem for those seeking to archive audio recordings.

MiniDisc offers relatively limited space (130Mb) and involves use of digital-audio data eliminating low bit-rate coding and companding.

Removable hard disks, RAID and data backup systems store audio in a digital format allowing the use of computer-industry standard removable storage mechanisms. The downsides are a lack of predictable history for computer data beyond 120 months or so, and the short term each technology exists in before it is superseded by a newer technology.

Magneto-Optical discs are possibly the new standard for archival recording, either as a computer data store or as a dedicated digital-audio recorder—as in Sony’s PCM9000. As to whether the chemistry of the recorded disc will be stable enough for archiving after the high powered M-O changes are made, the jury is still out and will continue to be so for a number of years.

The nearly insurmountable problem we face is that none of the new and old technologies that we have to archive 2-track or multitrack audio with have any long-term storage performance to consider except for the vinyl LP, multitrack analogue tape and CD. Although the unplayed LP does offer perfect capture, playback limitations are a factor. Tape has been relatively reliable aside from the worrisome shedding problem. It is interesting to remember that to one tape maker’s brochure (advertising custom tapes that even in a nuclear war, both audio tape and cockroaches would survive)

Martin Polon

Audio archiving: today’s problem or tomorrow’s loss?

CD-R is a real dark horse that is performing the archival task for computer users. Services are now coming to homes and businesses and producing a complete CD-ROM of the dump all files on a computer to permanently archive them. The fee is in the $50–$100 price range. The same thing is happening in recording studios as entrepeneurial individuals take advantage of the permanence and portability. CD-R is more than adequate for the near-term in professional audio but we do not have enough information as to long-term reliability.

One question that frequently comes up is whether to archive in the analogue or the digital domain. From the anecdotal evidence available from studio operators, plus the statistical data on storage of computer data—which after all is what digital audio is when stored on computer media—the answer is digital. That is, the storage of analogue audio—primarily on tape—has been relatively successful. Controversial tape-backing problems aside, the advantage of analogue is the presence of artefacts that have been extracted in reissuing an album 10, 15 and even 25 years later. Said one mastering expert, ‘Analogue is almost like freezing a loved one who is terminally ill, to restore them to health 20 years later when science has learned to cure their illness. The analogue tape holds acoustic treasures we may not be able to process out now, but that we can return for later.’

The methodology of storage may be as important or more important than the medium of archiving itself. It is not clear, for example, from US Government experience, that tape backing problems happen without fail to tape that was stored in ideal humidity and temperature conditions—such as in salt chambers or domes below the surface of the earth. It is equally unclear that some of the commercial tape storage ‘vaults’ have paid good enough attention to temperature and humidity control in the past. Smog is another factor that has not been properly studied, especially with the obvious history of smog attacking speaker surrounds, audio cables and other rubber and plastic items—over time. It may be that ‘smog proof’ storage containers are another way to prevent backing loss with tape over time, assuming proper storage temperatures and humidity. And let’s face it, a significant amount of audio history has ‘passed away’ in a storeroom in a studio complex with a water heater as a cell mate.

The nearly insurmountable problem we face is that none of the new and old technologies that we have to archive 2-track or multitrack audio with have any long-term storage performance to consider except for the vinyl LP, multitrack analogue tape and CD. Although the unplayed LP does offer perfect capture, playback limitations are a factor. Tape has been relatively reliable aside from the worrisome shedding problem. It is interesting to remember that to one tape maker’s brochure (advertising custom tapes that even in a nuclear war, both audio tape and cockroaches would survive)

One tape maker’s brochure assured customers that even in a nuclear war, both audio tape and cockroaches would survive
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Multichannel broadcast: proprietary battle zone or land of opportunity?

C4's Assistant Chief Engineer, Peter Marshall. He quickly adds, 'It's not a technical criticism, it's because it's controlled by one manufacturer. Really, we're entirely neutral on the issue. If a programme is supplied by an independent with Surround on two channels, we will transmit it unaffected.' Marshall adds that the station regards home cinema as 'tweakie', although he acknowledges that if Dolby Surround became a de-facto standard, C4 would 'take a positive line'.

The BBC's reservations have a more technical foundation, although Surround encoded material that passes technical standards is broadcast unaffected, albeit unannounced. 'We're not offering a multichannel service,' explains a spokesperson, 'but if the consumers can get it, that’s up to them. However, if something goes wrong with the Surround, to whom do they complain?' Mark Holland, Manager of Studio Operations at TV Centre in London, says that discrete multichannel systems are preferred, because the coded formats can introduce artefacts into the signal.

Like many satellite broadcasters, BSkyB see new technical advances as an extra selling point, and are using Dolby's double-D logo as a powerful symbol. Surround sound is being used on a wide variety of material, and Sky's programming reflects the broad applications: movies, Premier League football and international boxing on Sky Sports, and Sky One's entertainment series, including *Highlander* and satirical animated show, *The Simpsons*. 'We definitely see it as the future,' comments a spokesperson. 'If we're supplied in that format, we will use it and inform the viewer that they can get enhanced sound.'

At the moment, Dolby have this market pretty much to themselves and are not convinced about some of the objections to Surround, particularly those of its proprietary nature. 'The trademark is free of charge,' says Dave Learie, the company's Licensing Operations Manager, 'and you don't have to take out a licence on the system. Look at PAL and NICAM—they’re proprietary systems, yet certain broadcasters are quite happy to use them. In reality, all services broadcast in Dolby Surround, because it’s on every feature film.' As for coding problems brought about by the matrix, Learie comments, 'The encoding uses a patented 90° phase shift, and as our unit is used, the encoding signal gives accurate stereo.'

In the past year Dolby have released AC-3, a discrete 6-channel format (front left and right, rear left and right, centre dialogue, and sub-bass) which has been adopted by the US HDTV Grand Alliance. (Learie is quick to point out that it is not intended as a replacement for either Dolby Surround or Pro-Logic, the company's current matrixed formats.) AC-3 is big in America, already implemented for LaserDisc (but only NTSC can sustain the format due to its FM tracks) and cable, as well as HD.

In Europe, the bulk of work on multichannel sound revolves around MPEG, and as this is the standard for satellite broadcasting, the American DBS project looks set to adopt MPEG format audio. The Eureka 1187 group developing Advanced Digital Terrestrial TV and the DVB (Digital Video Broadcasting) project are 'looking at ways sound can be enhanced, compatible to standard mono and stereo', according to an inside source. The aim is to produce a standardised discrete 5-channel audio system. A subcommittee of Eureka 1187, made up of representatives from the BBC, Bang & Olufsen, Nokia, Philips and IRT, is currently working on this and is due to report to the full working party by the end of next year, with final ratification of any standard down to the International Standards Organisation (ISO).

Much of this work is based on Musiac surround, which is heavily favoured by the DBS project, and could form the basis of any decision made by Eureka 1187. A number of different companies, including Philips, hold patents for this technique, which would ensure it to those broadcasters who have problems with Dolby's current supremacy. The format is currently available on some products, including Video CD, and has been chosen for digital broadcasting by French station Canal+.

The development of a true standard would affect the consumer, many of whom either rent or own a vast amount of Dolby Surround encoded material. The advent of Musiac would require yet another box to be added to the growing clutter in peoples' homes, sitting alongside the existing Dolby decoder. A technical source close to the European work told me that, although the two would have to co-exist in the early days, future units could feature merely a plug-in chip for whatever format was needed.

As if things were not complicated enough, there is a 4-channel system on the way from a Japanese consortium, while Sony has its SDDS (Sony Dynamic Digital Sound) system, an 8-channel format optically printed onto 35mm film. Although this is exclusively used in cinemas at present, a spokesperson for the Cinema Products division ominously commented, 'This is Sony—anything can happen.' Perhaps the least likely option is the suggestion that quadrophonic could be hooked up to HDTV pictures.

While quad should be filed under NAO (Not An Option), multichannel sound for television is no longer merely a preserve of the enthusiast. Standards are being ratified but the crucial point is telling the viewer about it. If not, audio sweetening and the creative use of sound will be for nothing, and expensive home entertainment systems will become no more than modernist ornaments. And expensive ones at that.

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T
here is an old audio cliché that says, in television, sound has always been the junior partner. As with all clichés, there is an element of truth in this—which itself is a cliché. Before this becomes a metaphysical tract, it should be pointed out that the balance has started to be redressed in the past five years. One of the reasons behind this general upgrading of TV audio chains was the coming of stereo TV sound, thanks to that elaborate acronym NICAM (Near-Instantaneous Companded Audio Multiplex). TV stations went crazy over this new toy; continuity announcers could hardly contain themselves, breathing things like, 'And LA Law is brought to you in NICAM digital stereo.'

Nowadays they don't bother. The majority of programming is stereo today, but both the broadcasters and the viewers have moved on. TV stations are now looking at widescreen transmissions, with digital pictures for both satellite and terrestrial services seen as the future—a future which is not that far away. Meanwhile, the viewer has the option of turning the front room into a home cinema.

This may still be seen as an enthusiast's market, but research figures show that sales of large or widescreen sets equipped with Dolby Surround are on the increase, the only area of so-called entertainment electronics showing any kind of life. Despite this, audio now appears to be in danger of slipping behind again. When stereo TV was first mooted, the industry said that it heralded the cinema in the home, which has been shown to be untrue because both real cinemas and domestic setups revolve around multiple channels.

In the UK, the driving force has been Granada Television, producer of *Cracker* and the *Prime Suspect* series, both of which make the most of Surround and flag it clearly on the opening credits. 'Surround is a creative choice, but it's also part of the entertainment,' says Drama Production Executive Craig McNeill. 'The second time around, a lot of these programmes are going to sound very tasty.' However, he is frustrated by the reticence of others. 'There's no point doing shows in Surround unless you tell the viewer about it, and a lot of the broadcasters, newspapers and listings magazines don't bother.'

Other ITV companies have followed Granada's lead. A technical spokesperson for Carlton, the London weekend service, said the main concern was to ensure that the mono, stereo and Surround tracks were compatible. 'There have to be three levels of audio checking because the mix is different for each one. We're still learning how to deal with this.'

It is the same story of other broadcasters to do this that is angering the viewers who have invested in multichannel systems. It must be very frustrating to see the end credits showing a programme to have been in Surround and not have the decoder switched on, something that is very common with both the BBC's and Channel 4's treatment of movies and bought-in shows, notably *Star Trek: The Next Generation*, *The X-Files* and *NYPD Blue*.

The two services having differing reasons. 'Our position up to now has been that we wouldn't endorse it because it is not freely available,' says

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OPEN SYSTEMS INTERCHANGE:
REALITY OR PIE IN THE SKY?

Francis Rumsey explores file exchange and establishes the problems associated with moving audio and edit lists between Digital Audio Workstation systems.

A s professional-audio recording moves further into realms which are probably more the business of computer systems analysts, it pays to be aware of some of the gremlins waiting to catch out the unwitting explorer in the fields of audio networking and file exchange. One thing is for certain: we will always want to be able to exchange audio between systems and between facilities, because that is the way that work moves around organisations and around the world. But this relatively simple requirement is far from simple to deliver in the workstation world. Organisations investing in new technology lift up stones under which crawl masses of abbreviations: ATM, FDDI, OMNI, DDP, ISDN, WAVE, AIFP, Exabyte, PASC, all of which they know are important in one way or another. The question is: in what sense are they important and how much is it necessary to know about them in order to make a system work in which audio and edit lists can be moved about freely?

It is clear that individual manufacturers are capable of delivering integrated solutions based on networking and file exchange which work well. This is because they can control every element of the interchange process, and there are many layers at which compatibility must exist if operation is to be smooth and straightforward. The problems arise with the truly open system in which information is exchanged between equipment from diverse sources. Anyone who has tried setting up a mixed computer network in an office environment, with Macs, PCs and Unix boxes, will know how many different elements have to be coordinated before a satisfactory solution is established.

Although it is clear that there are a number of people associated with the audio industry that understand all of the issues involved—and understand them at a sufficiently comprehensive level to be able to develop solutions—it is also clear that the general level of ignorance is high. People talk about Exabyte as if it were a digital-audio-recording format like DAT, and about SCSI as if it were a digital-audio interface like AES-EBU. The problem is that people try to map existing knowledge onto unfamiliar territory, without realising that they are dealing with a wholly different set of concepts. Yes, Exabyte can carry digital-audio information, but in all sorts of different ways, depending on the way it is formatted and so on. Yes, SCSI can be made to transfer audio data, but you cannot simply connect it to another SCSI interfaced system and expect the two to talk to each other.

Horses for courses

In the past, the digital-audio industry made for itself a number of dedicated formats for carrying audio, either in electrical or physical form. The former examples of DAT for carrying stereo audio on tape, and AES interfaces for carrying stereo audio over wires are good as illustrations. Now that audio is stored in the form of data files, the question of formats still exists but it now has many different layers. The physical medium and the data format are no longer necessarily tied (although a particular configuration might be recommended for convenience). Indeed this has been discussed in these pages before, but there is no harm in reiterating some of it because the education process required is quite phenomenal if what might be called the 'traditional' audio industry is to make the leap into the age of the dreaded information superhighway.

It is easy to get swept along by the attractiveness of networking solutions in the field of digital-audio workstations, but whether you actually need a network or not depends very much on the operational applications envisaged. There are also many different kinds of network which suit different purposes, and the distinctions are subtle. The approach adopted to audio data ▶
FILE EXCHANGE

Hardware platform  e.g. Macintosh
Operating system  e.g. System 7
Mass storage  e.g. SCSI hard disk
Filing system  e.g. HFS
Files  e.g. Sound Designer II

Fig 2: The hierarchy of compatible file systems with examples of implementation

interchange requires very careful systems analysis, of the kind one might perform when introducing IT (Information Technology) into a corporation for office automation. What precisely are people likely to want to do in day-to-day operations, and what capacity for future development is required?

It is a strongly held view by some that networking—rather than physical media interchange—will offer the key to the future in audio operations. It is quite possible, for example, that one might receive and send out commercial projects this way in the future. One might send CD masters for pressing over a network to the plant, or, to look at a more radical alternative, one might never expect to see the result of one's labours in a physical form and simply be preparing audio information for issue on demand over an on-line service. The solution to suit one person's requirements is going to be very different to that which might suit another.

The industry has long awaited a universal format for audio information interchange, and the Open Media Framework Interchange (OMFI) widely trumpeted by its promoter, Avid Technology, is the subject both of guarded welcome and considerable scepticism by other manufacturers. It is freely available to anyone who wants it, though, so no one can complain about licensing fees. Its main potential application is at the recording and postproduction end of the chain, allowing files of audio data and associated edit lists to be exchanged between systems. To potential workstation users it may seem to be a dream too good to be true, and is far from being properly understood. People know that it is supposed to offer a solution to interchange of audio between systems, and this has been demonstrated, but the extent to which OMFI defines all the elements of that interchange is not clear to many. Adding to the confusion, manufacturers such as DAR are announcing "open media-type" approaches to networking and file exchange which are almost certainly not the same as OMFI. At the CD premastering end of the chain, a number of formats exist for transfer of finished masters to pressing plants, again much misunderstood by potential users. People often associate DDP (Disc Description Protocol), devised by Doug Carson Associates, with the physical format of Exabyte tape, but in fact DDP is entirely medium independent and could be carried over a network (or an optical disc if required). These examples simply serve to illustrate that layers of confusion have been added to the once simple business of getting audio from place to place, and it cannot be to the advantage of the business in general that this should continue.

Layers of compatibility

There is a well-known model in the networking business known as the ISO 7-layer model for open systems interconnection (OSI). It warrants careful study, since it shows how many levels there are at which compatibility between systems needs to exist before seamless interchange of data can be achieved (Fig 1). It shows that communication begins with the application and filters down through various stages to the layer most people understand—the physical layer, or the piece of wire over which the information is carried. Layers 3, 4 and 5 can be grouped under the broad heading of 'protocol', determining the way in which data packets are formatted and transferred. Those familiar with computer systems and the Internet may already know of examples such as TCP/IP, Novell Netware, AppleTalk and DECNet.

Recent networking solutions in the audio field, such as those proposed by AMS Neve, Siemens, Sonic Solutions and others, use high speed optical fibre technology such as FDDI and ATM. Other companies, such as SSL and DAR are sticking with the slower Ethernet for the time being, although not attempting to use it for the purpose of transferring large numbers of channels of audio in real time. Ethernet, FDDI and ATM are examples of physical network standards which may also specify further layers within the OSI model. FDDI, for example, specifies only the first three layers of the OSI model (the physical, data link and network layers). Sonic Solutions have taken the step of developing its own network protocol for transporting audio and other multimedia data over FDDI in a form which ensures optimum use of bandwidth, and allows systems to guarantee that real time audio transfers, once started, will be able to complete without breaks (the so-called 'reservationist' approach). They have therefore gone further through the OSI model than the first three layers specified in the FDDI protocol, allowing them greater control over the way in which data is transferred. The alternative to this highly controlled approach is a form of network 'free for all', which assumes there is more network bandwidth than will ever be needed at any one time, allowing applications to grab whatever bandwidth they can for file transfer operations. This is simpler, but less reliable in cases of heavy network load.

The other major area of confusion with interchange relates both to networked exchange and physical media exchange. It is the area concerned with disk filing systems and their interface with the platform on which the application handling the audio resides. Everyone probably knows that MS-DOS computers won't read Macintosh disks, and that Macs can only be made to read MS-DOS disks with the addition of some usable software such as PC Exchange. This is an example of the problem. Operating systems format disks in different ways, and this relates not particularly to the data files on the disks but to the way that the sectors are formatted, files stored, and the directory structured. This is the reason why you can't just take a SCsi disk which previously had been connected to a DAR SoundStation and connect it to a Macintosh running DigiDesign Pro Tools. Electrically there would be no problem, but the Mac's operating system would not be able to interpret the disk format. Even if it could, Pro Tools would not be able to read the files it found there. It is possible to equip computer platforms with drivers that will read and write disks in filing systems other than their own, but the need to do so has to be recognised, and the solution may not be immediately straightforward. File names in one system may be restricted in a different way to those in others, for example. Again there is a hierarchy of compatibility levels (Fig 2).

It is important to realise that open concepts such as OMFI, introduced above, have no influence or control over the aforementioned aspects of inter-system compatibility. They only aim to specify
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It is clear that although it might be convenient for audio exchange to be tied to certain specific physical media, filing structures or network protocols, this is not really in the best long-term interests of the audio industry. Therefore it is vital that we wake up to the fact that the disks and tapes we use, and the network wiring that we put in place, are only ways of getting formatted data from place to place, and that we may expect to change these physical interchanges in media quite regularly as the years go by, in order to take advantage of speed and capacity increases, as well as improvements in open systems design that may come along. To do anything else would not be taking full advantage of the computer industry, upon whose back this industry rides. If we are going to have the curuses of that industry, we had better have the blessings as well.

To reiterate the examples raised at the beginning of this article, we must stop talking about Exabyte as if it were a term that described organisations themselves, or a format, just as we must stop talking about network media such as Ethernet or FDDI as if they were standard audio interfaces. Instead we must get to grips with the issues which really define inter-system compatibility, which are filing structures, network protocols, and file formats themselves.

To give an example of this, DAR have recently announced a networking option for their products, and at the same time they are rewriting their filing structure and audio file format. Why? Because their own native file format is not compatible with other systems, and if they want to be able to share audio files with other users on the same network they will need a more widely-used approach. Consequently, it is proposed that DAR’s audio files will be stored in the Microsoft WAV format which will be easily read by many other multimedia platforms. It has certainly been the case in the last ten years or so of the workstation revolution that many manufacturers’ file formats and filing systems were the key to their operational success. They were the key to achieving high throughput of data to and from disks with limited transfer bandwidths, and consequently the key to handling larger and larger number of machines in real time. Sonic Solutions were an example of such an approach, where the disk containing the audio information was formatted in a unique way (the Media Optimised Filing System or MOFS), different to that of the Mac on which the system ran. MOFS has had the small idiosyncrasies of the real sound files which were stored on a disk interface directly to the Sonic audio card. Since disk drives are now much faster than they were, the need for sophisticated private audio filing structures may become less of an issue, and compatibility with other systems may become the overriding factor. Digital design applications, for example, store audio in the plain vanilla Macintosh filing structure, so they are visible on any Mac desktop.

(sonic Solutions MediaNet software allows remote volumes formatted in the MOFS fashion to be accessed using the standard Apple Filing Protocol system, so that the volumes can appear like normal Mac volumes and be accessed by standard applications. They also expect to extend this approach to encompass Unix and DOS systems as well.)

**What does OMFI specify?**

The OMFI 1.0 specification is quite lengthy and deals with descriptions of the various types of information that can be contained and the methods of containment. As far as the audio user is concerned, the 1.0 version specifies that the common audio formats to be used are the uncompressed versions of either the AIFC or AIFF formats, which are written in the big-endian byte ordering typically used by Motorola-based electronic equipment, or the WAV format which uses the little-endian byte ordering as handled by Intel-based equipment. It also allows for the possibility that manufacturers might want to specify ‘private’ audio formats, which would be used in the future. Since OMFI is in fact principally concerned with video exchange, most of the document refers to video operations. Cuts and effects are all described in video terms and there is very little that refers to audio crossfades at edit points. So far as it is possible to ascertain, v1.0 of OMFI specifies no more for audio than a common format for the audio data files and a means of specifying edit points and basic crossfade durations (but not the shape). This is indeed a start, and Arvid are proposing that the next version of OMFI due out later this year.
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(v.2.0) will also contain means of transferring audio volume, pan and EQ information. All of the audio, video, and other media data, as well as composition data (edit list, effects and so on) is contained using an Apple container format known as Bento. This is rather like a large folder in which a number of files can be included, along with a table of contents. As indicated above, although people may use optical discs or Exabyte tapes as a means of transferring OMFI files between workstations from different manufacturers, the standard does not say anything about this, neither does it say anything about the filing system or hardware platform associated with the files. Those working with OMFI at Avid claim to have investigated a platform independent filing structure known as TAR which might be recommended as a possible move towards being able to specify more about the filing structure of OMFI data. TAR drivers could then be used on any hardware platform needing to mount volumes containing OMFI data, no matter what filing system was native to the platform concerned.

One of the useful things about OMFI audio files is that they can be used as the native format for a workstation’s audio storage. This might not be an optimal solution from a performance point of view, but the standard has apparently been designed for this to be an option.

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Premastering for CD

The issue of standard formats for the interchange of data destined to be mastered onto CD is similarly fraught with confusion. The old Sony 1630 format is gradually being replaced with more recent developments, the most popular of which are Exabyte tapes containing DDP data and PMCDs (ordinary audio CDs with a burst of modulated FQ subcode at the start). Sony are trying to push their MDselect format as the format for carrying audio all the way through from original recording to CD pressing plant, but with little clear success to date. The DDP format is available to anyone who wants to use it, and, as mentioned earlier, is not tied to any particular physical format, although most people are currently using Exabyte since it is relatively cheap, almost error free, and quite robust. The transfer rate to and from Exabyte is also relatively high, allowing CD masters to be dumped at speeds in excess of real time—a factor which will become of increasing importance as pressing plants begin to cut CDs at many times real time.

The fact that many ignore about DDP is that it is really a transfer protocol, not designed specifically for replaying audio in real time. One hears people saying things like ‘I don’t know a workstation that can replay a DDP tape’, but that is not particularly surprising. PMCDs, on the other hand, are not really any different from ordinary CDs, and can therefore be played in an ordinary CD player. It is perhaps an advantage that DDP is simply a means of describing the contents of a CD to a glass mastering system, because it is unlikely to be played or modified by anyone other than the pressing plant. If the time comes when mastering houses or studios are connected via high speed networks to the outside world, then CD masters could be dumped using DDP to a pressing plant without the need to go via a physical transfer stage.

Where next?

It is certain that the less end-users know about the issues involved in open systems interchange of audio data the more they will be at the mercy of manufacturers who insist that they must buy everything from the one source. This is not an entirely healthy situation, since it limits freedom of choice and system flexibility, but it has its merits in that the user can be sure he knows who to blame if it doesn’t work. The next stage in the maturing of this relatively new field seems to be in the tentative partnership between small groups of manufacturers, such as DAR and Lightworks, who decide to collaborate over making their systems talk to each other. We may not quite be at the stage where multimedia systems consultants can be brought in to pick and mix equipment from different sources, with the appropriate network and file system drivers to make them talk to each other, but we are not far off.

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Bell Labs, the research wing of AT&T, recently demonstrated a prototype solid-state personal stereo for joggers, and predicted that the price of 'memory chip music' could start to compete with tape by the next century. The prediction does not rely solely on memory prices falling, it relies also on Bell's work on digital audio compression. The system is called PAC, Perceptual Audio Coding, and Bell developed it for use in DAB (Digital Audio Broadcasting).

Several DAB systems are competing to become the national standard for the US. They all use terrestrial transmitters, to broadcast in the current FM band, using the current 200kHz channels. Each existing analogue station always has an unused channel on either side to prevent interference. So the DAB systems will put low-level digital signals in the taboo channels. As long as the digital taboo signal is at least 35dB below the FM signal in the neighbouring channel, there should be no interference to existing stations. So they can simulcast the same programmes in both analogue and digital form. Whether the low strength digital signal will be jammed by distant FM stations remains to be seen.

The rival DAB systems use different ways of distributing the digital code. But the instigators are also split over what type of audio compression system to use. Some back Musicam, as used for Europe's Eureka digital broadcasting system, and others prefer Bell's PAC.

PAC works by splitting the audio signal into narrow frequency bands, analysing the sound waves in each and digitising only those that the human ear will notice. Europe's Musicam works in the same way. But whereas Musicam splits the sound into a few hundred bands, PAC uses over a thousand. This adds to complexity but allows more accurate analysis.

Also, whereas Musicam digitises the left and right stereo channels separately, PAC continually analyses the difference between them. If the music is mainly mono, for instance a solo voice or musical instrument, there is no difference between the left and right channels. So PAC saves bits by coding only a mono signal, when the whole orchestra strikes up to make a wide stereo spread, PAC transmits all the bits needed for accurate reproduction. Memory buffers keep the average data rate constant.

PAC currently delivers near-CD quality from a data stream running at 128 kbit/s, compared to around 1.4 Mb/s for CD. This compression ratio of over 10:1 is more than twice that ratio used by MiniDisc and DCC. Bell are confident of 20:1 compression by 1998, and 40:1 by the year 2000. Although CDs can run for 74 minutes, most albums run for less than 60, so one CD equates to 16Mb of chip memory. By the turn of the century memory should be down to $0.5 per Mb. This is still more expensive than a pressed CD, but it opens up the possibility of squiring a CD down a 64 kilobit/s phone line in around half an hour.

American indecision over DAB compression systems and the BBC's maverick approach to audio codec systems for ENG

In cost-cutting with Armani management and you get a lethal combination. No, I am not talking about the British National Health Service and hospitals. I am giving just one example of the BBC's creeping internal corruption.

When the BBC started using ISDN for audio, someone, somewhere decided to standardise on the G722 standard for 64 kilobit/s mono links. So studio control rooms now have G722 codecs to match portable G722 codecs carried by reporters. But the independent local stations and news networks chose the apt-x standard instead. They thought the quality was better and the processing delay shorter, which makes the cue feeds less distracting. So all these stations and their reporters now have mono apt-x codecs.

It is hard to see why the BBC chose G722; it was available earlier and the Belfast company that developed the very clever apt-x technology have done a very poor job of selling itself. When apt-x coding was chosen for the DTS cinema sound disc system used for Jurassic Park, the Belfast company fumbled the chance to make valuable publicity capital out of the big break. The BBC's news room in Belfast did not run the story because, they admitted later, 'they did not believe it could be true'.

Obviously there are times when the two worlds of news radio, BBC and independent, need to communicate. They may need to pool a story or share a reporter: so the independent new stations have installed a few G722 codecs.

Inside the BBC's Broadcasting House (BH) there is just one apt-x mono codec. It lives inside the EOC (Engineering Operations Centre) and if you find the right person to talk to it can be used to dial out to a reporter's codec. The feed is then patched through to any studio inside BH. It is even possible to patch incoming G722 and apt-x feeds together to produce an interview between two remote locations which is apparently coming from inside BH or any other regional studio.

I have tried the EOC patch and it works like a dream, but only if the bureaucracy stays out of the way.

Recently we tried and failed for a full hour to connect with an apt-x codec as a succession of studio engineers all thought they knew best, dialled out with G722 codecs and then complained of faulty equipment. This makes as much sense as trying to ram a Betamax cassette into a VHS recorder.

Someone in the EOC then said the BBC had got rid of their solitary apt-x encoder. They were mistaking it for a stereo unit which normally also lives inside the EOC, but had been temporarily shipped to East Germany for broadcasts from Belson. On other occasions the EOC have tried to dial a mono codec with one leg of the stereo unit. That fails too. And behind it all there is the running sore that use of the EOC's prize codec should be prebooked with paperwork through the Schedules Department. The paper pushers do not always bother to pass on the final instruction that the codec is apt-x mono. All in all it's a great way for Britain's national radio station to handle hot news.

The bureaucratic corruption even extends down to the reception desk. I nearly missed a live broadcast recently because the one security clerk on duty did not have the phone numbers of the studios to call when guests arrive.
THE BASIC FACTS:

ALGORITHMS: MUSICAM (56.384kbps)
Layer III (32..320kbps)
G.722/G.711

AUDIO IN/OUT: AES/EBU
S/PDIF
Sample Rate Converter
Analog

EXTERNAL SYNC: XLR, BNC

AUDIO MODE: Mono, Dual Mono, Stereo, Joint Stereo

SAMPLING RATE: 32, 44.1, 48 kHz

REMOTE CONTROL: RS232

ANCILLARY DATA: RS232/2I according IRT

ALARM/CONTROL: 8 Bit bidirectional

DATA INTERFACE: X.21

SMPTÉ TIMECODE: LTC and VITC (Option)

B-CHANNEL SYNC: ITU-T J.52

ISDN INTERFACE: 3 x S₀ (Basic Rate Interface)

SOFTWARE UPDATE: Download via ISDN and PC

THAT'S VP!

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