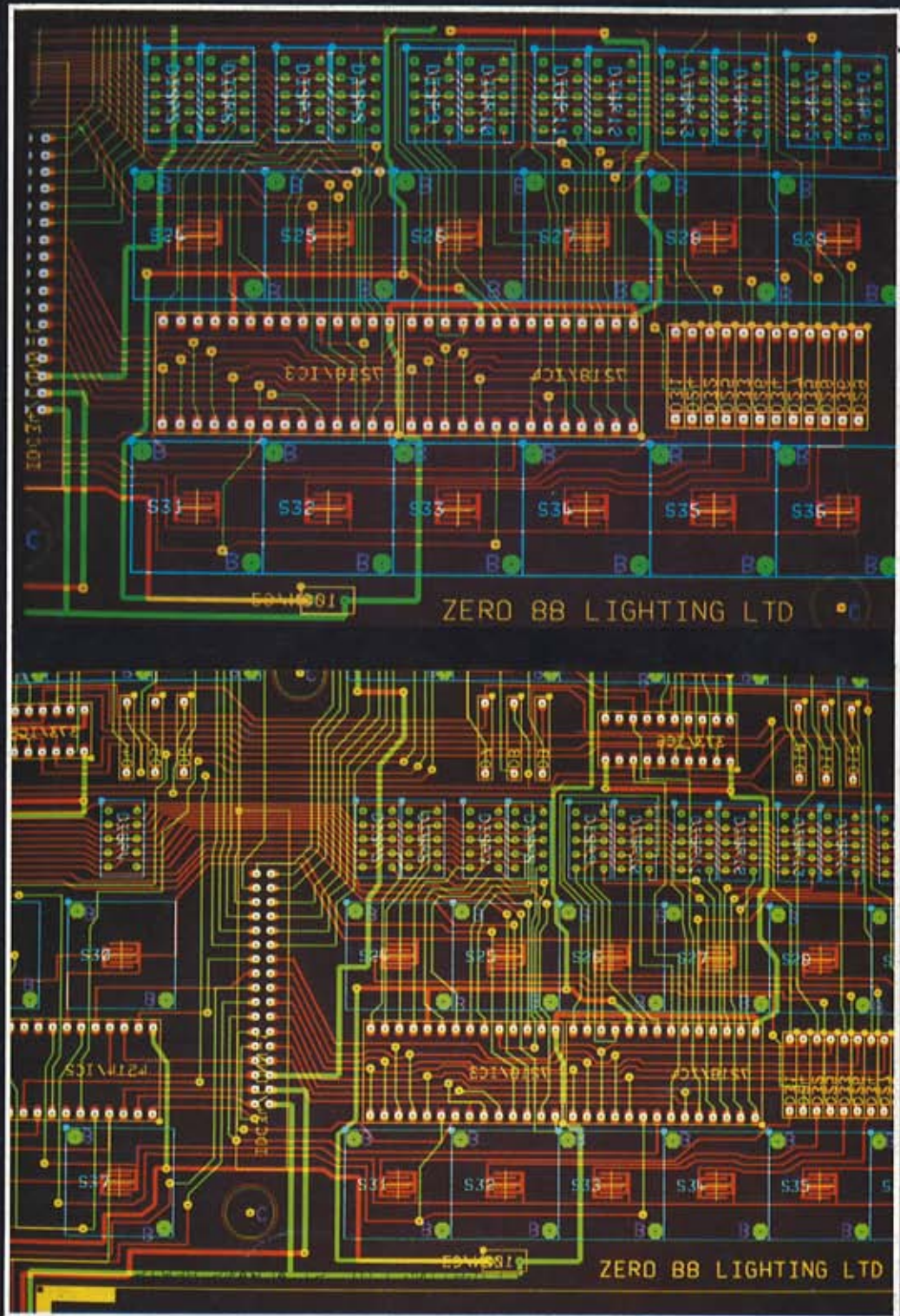


LIGHTING+SOUND *International*



'Insider' Design - an up-front view of Zero 88's new Sirius lighting desk.
(see feature 'Behind the Scenes at the Manufacturers' in this issue)

PLASA

Published by the Professional Lighting and Sound Association

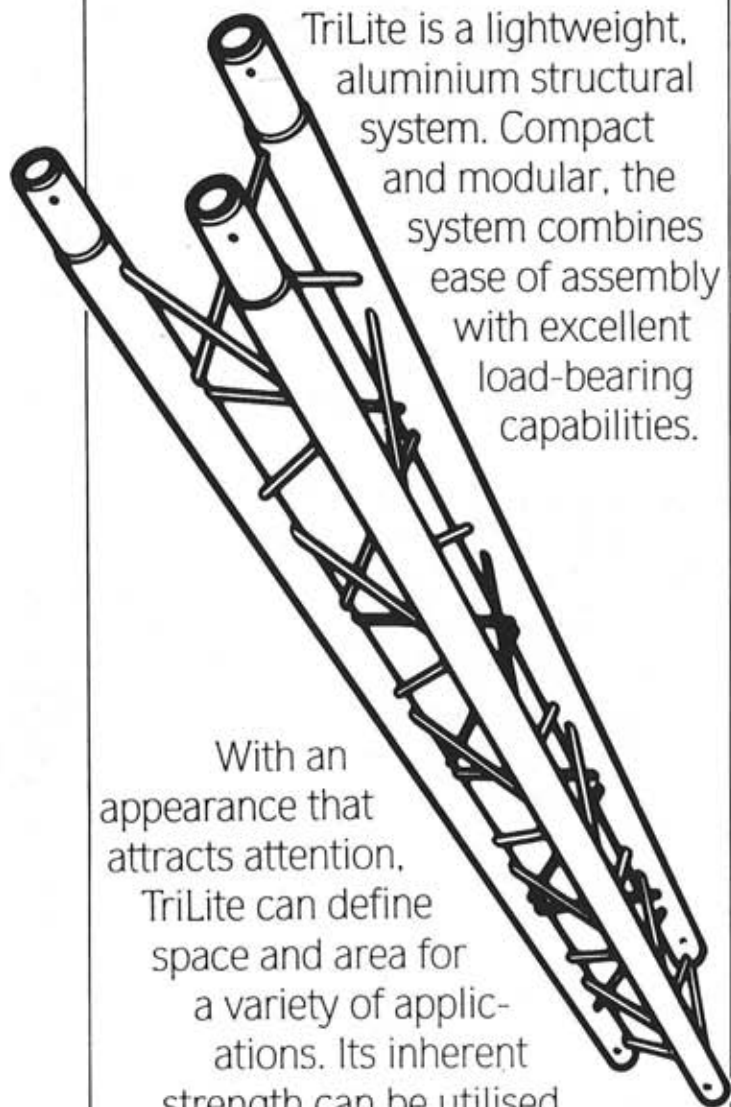
February 1988
Volume 3 No.2

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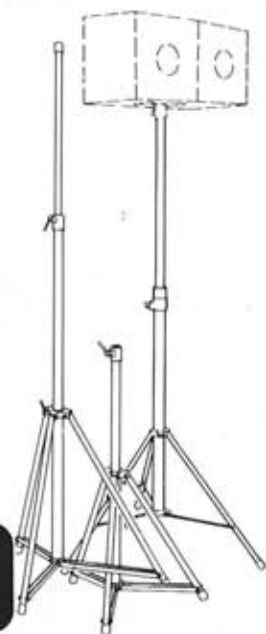
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Equipment

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The Series 2 Range of lighting control systems are designed and manufactured by Celco Ltd. For further information please contact our distributors. Worldwide Distribution Cerebrum Lighting Ltd, 166 Chiltern Drive, Surbiton, Surrey KT5 8LS tel/(01) 390-0051 fax 892337 Celco G US Distribution Celco Inc, 30 B Banfi Plaza North, Farmingdale, New York 11735 tel/(516) 249-3662 dialcom IMC 1285.

LIGHTING+SOUND *International*

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New Products Party

On show in early January at a special product party at Donmar's Covent Garden base was CCT's complete luminaire range including the new Silhouette 1200, which can take the latest T29 1200W lamp as well as the T19 1000W. Also to be seen was the completely new 2000W Silhouette for those who need a particularly powerful profile spot, and the new Minuette 650W condenser optics follow spot - ideal for clubs, discotheques and smaller theatres.

Director David Manners told L+SI that the near week-long event was important to the company as it enabled them to solicit the views of the many technicians and designers who attended, most particularly on several experimental ideas which CCT have been looking at. Results can be expected at the ABTT Trade Show in April . . .

Meanwhile, James Bishop of Donmar has confirmed that stocks of the new 1200W T29 are now available.

In the picture above, David Manners and Jack Watling of CCT (right) listen to some technical comment.

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International

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PLASA

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Light + Sound Show 88 gets Bigger and Bigger

With a full seven months to go, and over 90% of space sold, PLASA Show organiser, David Street, told L+SI that plans are being finalised to expand floor space availability. "There has been a huge demand for space from both UK and overseas exhibitors," he said.

The new areas will mean opening up the second floor of Olympia 2 and the area available to PLASA covers 800 sq. metres of exhibition space, representing over 30 additional stands.

Discussions are also well advanced for the 1989 Show at the same venue, and additional space is being sought at an early date. "It certainly looks good," said David Street.

For details of Show space ring 01-994 6477.

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Klark-Teknik Take Over Celco Inc.

On February 1 Klark-Teknik Electronics Inc., the U.S. division of Klark-Teknik Plc, acquired the assets, liabilities and trading name of Celco Inc. from John Lethbridge and Colin Whittaker of Cerebrum Lighting.

Celco Inc. will continue to be the sole distributor of all Celco products within the U.S.A., and a distributor of Thomas and Socapex products. Cerebrum Lighting (Sales & Hire) Ltd. will continue to be the sole distributor of Celco products for the rest of the world excluding the U.S.A.

Norman Wright will remain as national sales manager for Celco Inc., assisted by his wife, Alison. Jack Kelly becomes president of Celco Inc. and John Lethbridge and Colin Whittaker have resigned as officers of the corporation.

The Boards of Cerebrum Lighting (Sales & Hire) Ltd. and Celco Ltd. fully supported the takeover, and say they look forward to a continuing trading relationship with Celco Inc. John Lethbridge told L+SI that they wished to thank all past customers, suppliers and friends for the part they have played in the growth of Celco Inc. and that he looks forward to seeing many of them on the Celco Inc. booth at the U.S.I.T.T. Exposition and Conference at Anaheim, Los Angeles from March 23 to 26, where several exciting new Celco products will be on show.

New Managing Director for Strand Lighting

The Rank Organisation has confirmed that Strand Lighting's managing director Michael Jukes left in mid-December after less than six months with the company and that his position has been taken over by Oliver Hartree as from January 18.

Oliver Hartree has been with the company for four years, and was formerly operations director Europe, based at Strand's factory in Kirkcaldy, Scotland.

First in India?

In January 1988 Dynamic Technology Limited shipped to India State Television the first (?) computerised lighting control system ever to be installed in India, and the contract was won against stiff competition from other manufacturers and system suppliers. Working in conjunction with their West German agent, RDS Lichttechnik, a complete package of hoists, top steel work, lighting control and dimmers is being supplied by DTL.

The lighting control systems are each based around a 256 channel Datalite having two group playback modules, memory and channel control modules, a standard CPU with extra capacity for future expansion, and a hand-held remote. A Datadisk system is included, allowing softpatch, individual dimmer curves for each dimmer, text entry/playback and additional memory information. A 10 way-manual panel with pin matrix is provided for system back-up.

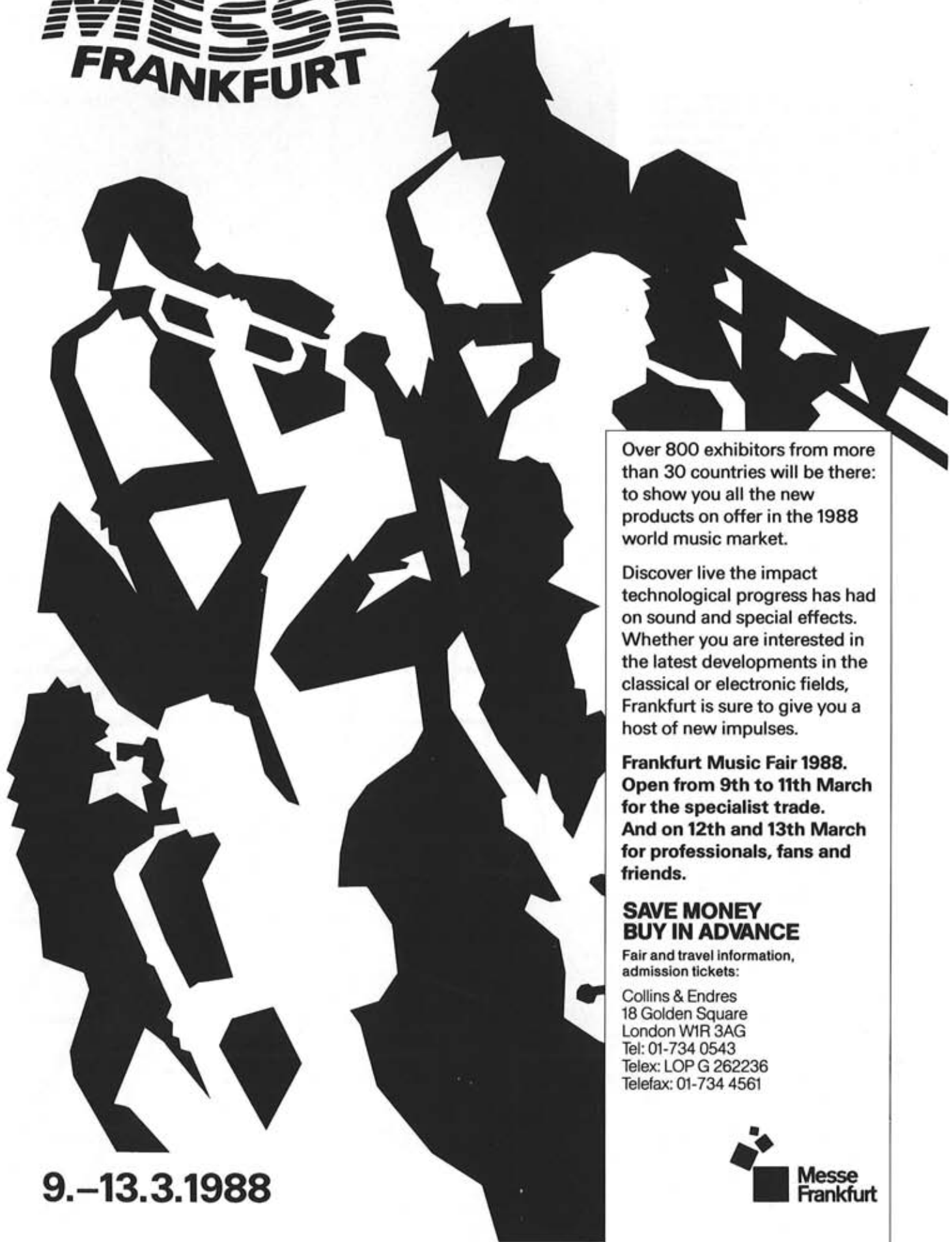
Another Strand Mover

Eric Baker has left the Rank Organisation after 23 years, and is to join the British Electrical Manufacturing Company (BEMCO) to reinforce their already considerable lighting business.

Together with Brian Barkes, managing director, he is to establish a new lighting department to serve the needs of all branches of the industry including architectural, stage and television lighting. His new position will be general manager of this department, and Eric will be delighted to hear from any of his old associates. His new contact number is 01-874 0404.

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Over 800 exhibitors from more than 30 countries will be there: to show you all the new products on offer in the 1988 world music market.

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 **Messe
Frankfurt**

New Donmar Reference Manual

In their silver jubilee year, Donmar have just published the third edition of their award winning Reference Manual, a technical 'bible' for the professional theatre.

The 80 pages cover the entire range of theatre stage and lighting equipment including luminaires, control desks, dimmer racks, intercom, stage management desks, rigging, internally wired bars and optical pyrotechnic and special effects. Other sections cover scenery, rostra, drapes, curtain tracks, scenic and designer materials, flame retardants, specialist aerosols, scenic paints, adhesive tapes, pulleys, ropes, ironmongery, music stands, dance floors, multicore cables and connectors, colour filters, gobos and myriad other items.

Of special interest are the informative charts on the different equipment available from the leading UK manufacturers that enable proper comparison of their facilities to be made as well as helpful notes enabling potential purchasers of theatre, and studio equipment to assess their needs and secure value for money.

The Donmar Reference Manual is available from Donmar Limited, 22 Shorts Gardens, Covent Garden, London WC2H 9AU. Price £3.80 including postage.

A full review of the new Reference Manual will be included in our March issue.

Pink Floyd Choose BSS

Pink Floyd, renowned for their meticulous attitude to sound quality, have added another 24 channels of BSS MSR-604 to their fully-active stage box system, which was already using 72 channels. It gives them improved quality over conventional stage box systems and provides independent outputs for any live recording and broadcast needs.

They have also invested in five of the new BSS Midi Noise Gates, the DPR-502, which added to their DPR-402 Compressor De-Essers, confirms their commitment to the finest in creative audio control.

BSS have addressed the endemic noise gate problem, of leading edge information, by incor-



Mick Sturgeon, Pink Floyd technician, with BSS DPR-502 Noise Gates.

porating Automatic Dynamic Enhancement technology within the architecture of the DPR-502. This radical new development, combined with bi-directional MIDI interface facility, provides the professional user with a unit equally well-suited to studio or live environments.

Laser Chorus available from Avitec

The American manufactured Laser Chorus, introduced into the UK by Avitec at the 1987 PLASA Light and Sound Show, is now available for demonstration. It is an exciting new programmable lighting system providing synchronised projections of multi-coloured laser beams.

Using low voltage line feeds for safe and simple installation, the Laser Chorus system comprises a sophisticated but user-friendly controller module triggering helium neon laser scanner heads available in a choice of four beam colours. The controller features stereo audio inputs and

positive-feel switching, and offers three user memories (each containing up to 64 steps) and a choice of sixteen projection patterns for instant call-up of various tunnel, plane and beam effects. All effects programs can be set for adjustable automatic rate, audio synchronisation, or manual joystick control. A single controller module can operate up to twelve laser heads.

The laser heads, each supplied complete with a 30m control lead, are priced according to beam colour, with the difference in price reflecting the use of advanced technology which has enabled these three extra colours all to be extracted from helium neon. Hitherto, much more expensive gases would have been required to produce this range of colour versatility.

Avitec are now stocking all Laser Chorus components and will be pleased to arrange demonstrations by appointment, either on-site or at their Hitchin HQ.

For further information and prices, contact Avitec Electronics (UK) Limited, 80-81 Walsworth Road, Hitchin, Herts, telephone (0462) 58961.

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Please send me details on how I can bring a new dimension to my lighting.

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Celestion Sponsors

Ipswich-based loudspeaker manufacturers Celestion International have agreed to sponsor Suffolk County Council's Rock and Pop Band Festival Competition for a second year.

"Entering this competition could be the first step to stardom for a young group, so for 1988 we hope to be able to motivate our contacts within the music industry to ensure that notice is taken of the wealth of talent available within the Suffolk area," said sales manager Martin Prescott.

Pictured above at the Ipswich launch of the Competition are Celestion chairman and managing director Gordon Provan with Suffolk County Council education officer, and Competition organiser, John Seabrook.

Concert Sounds

Heywood, Lancashire-based sound specialists Wigwam Acoustics have just completed major contracts at two of Britain's leading concert venues. At the Fairfield Halls, Croydon, a complete re-wire has involved some three miles of cable in a project worth over £140,000. Equipment installed included a central cluster of eight Meyer UPA1 speakers plus seven distributed speakers to meet critical specifications. Most of the equipment was fitted to a motorised hoist,

stored in the ceiling of the auditorium.

Wigwam also installed a BSS active microphone splitter, and Fairfield is understood to be the first major UK venue to utilise this system, making the venue one of the best equipped concert halls in the UK.

At the Harrogate Conference Centre, Wigwam have also installed a new sound system, concealed in the existing superstructure, in a contract worth £26,000.

On the touring front Wigwam were one of the first sound companies to pioneer the 72-way active splitter system using units devised by Brooke Siren Systems, and they have just returned from a James Last European Tour and Billy Joel Russian tour with the equipment well proven. Featuring an active four-way microphone splitter, the system was used in conjunction with the Fleetwood Mobile Recording Truck and proved hugely successful for recording and broadcasting. The package was put together by Wigwam engineers and it is thought to be the first time the new system has been used on tour.

Note: Wigwam's new sound system for Fairfield will be featured in our March issue.

Electromusic Take On Crest Audio

Electromusic Distribution Limited have secured exclusive rights to distribute the US-manufactured Crest Audio range of professional power amplifiers.

Based in the Smithfield area of London, Electromusic already handle distribution for Turbo-sound products, and the addition of the Crest Audio Range is the first move into a diversity of new products that the company will promote throughout the U.K.

Managing director Mike Novak told L+S: "Crest amplifiers are used by a great number of leading sound rental and installation companies throughout the World. It is a real thrill for us to have been appointed as exclusive distributors for such a prestigious product range. With the reduc-

tion in the value of the Dollar, Crest amplifiers can now compete, not only in terms of quality - for which they have always been highly regarded - but also on price. The customer will be getting a top-quality amplifier of proven reliability for the price of a more basic product."

Telestage goes into Receivership

The major stage and studio engineering operation of Telestage Associates went into receivership on January 26. Founded in 1971 and based in Bury St. Edmunds, for five years - from 1979 to 1984 - it was part of the Rank Organisation.



New at Soundcraft

Alison Brett has been appointed marketing manager for Soundcraft Electronics. During her two years at the University of Warwick's much vaunted Business School, she specialised in marketing innovation, new product development and corporate planning. Before joining Soundcraft, Alison Brett spent three years with 3i, the UK's largest venture capital company, collecting and interpreting market information.



Strand Lighting

Project Estimators and Engineers — make that leap in to a new career in 1988!

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Manager — Quotations and Projects (Ref. LSI/PM) who will be responsible for the successful management of the team of Engineers who manage major projects and prepare quotations from conception through to completion. Some overseas travel will be involved.

Project Estimator (Ref. LSI/PE) who will join the team responsible for the design and costing of lighting schemes for a wide range of customers. This position offers scope for career advancement for the right person.

Both positions carry attractive salaries and fringe benefits associated with a large international company

If you measure up to these requirements apply, quoting reference, to Mr. R. G. Whittet, Personnel Manager, Strand Lighting, Grant Way (off Syon Lane), Isleworth, Middx. Tel: (01) 560 3171 by 19th February.

International Sales Manager

A leading international distributor of entertainment lighting equipment, based in the south-east, with an annual sales turnover in excess of £3 million, is seeking an experienced sales technician to join our sales team in a senior position as International Sales Manager.

The successful applicant should have at least ten years experience in the entertainment lighting industry, and a broad knowledge of theatrical lighting control systems and luminaires would be an advantage.

The job will involve frequent sales trips overseas, and the organisation and manning of four or five trade exhibitions each year.

It is anticipated that the successful applicant would be aged between 30 and 50, and hold a clean driving licence.

A remuneration package in excess of £20,000 p.a. is offered, which would normally include a company car.

Applicants should send a C.V. to 'Lighting & Sound International', 7 Highlight House, St. Leonards Road, Eastbourne, East Sussex BN21 3UH, and mark the top left-hand corner of the envelope 'CONFIDENTIAL - C.V.' Applications will be passed on by the magazine unopened, and will be treated with the utmost confidence. All applicants will be contacted, and interviews will be held during February.



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Theatre lighting

9 - 21 October 1988, London

Over the last twenty-five years there has been an enormous growth in the contribution of lighting to theatre performance. Developments in the technology and an increasing awareness of the visual potential have interacted to such a degree that the lighting designer has become a senior member of the creative team of most stage productions.

British lighting control systems and spotlights have become familiar all over the world, and many British lighting designers have been invited to light productions in major international theatres. This 'lighting revolution' has coincided with a particularly creative period in Britain's theatre history and so London is a particularly apt centre for a study of today's stage lighting and for speculation upon its future.

The course will examine the role of lighting in current staging practice. It will explore the technical and organizational means by which concepts can be developed and realized in this finely balanced mixture of art and technology.

The Director of Studies will be **Francis Reid**, Lighting Designer, formerly Head of Theatre Design Department of the London Institute's Central School of Art and Design and author of *The Stage Lighting Handbook*.

The course is structured to interest all those who are involved in the provision of lighting for performance. In addition to specialists responsible for lighting design on all forms and sizes of stages, it is hoped that participants will include people concerned with designing and manufacturing lighting equipment, advising on its installation and educating its users.

There are vacancies for 25 participants.

Fee: £1,605 residential, £1,125 non-residential.

The course will be held at the British Council's theatre in Portland Place. Resident participants will be accommodated at an hotel.

 **The British Council**

Further information and application forms are available from British Council Representatives overseas or from Courses Department, The British Council, 65 Davies Street, London W1Y 2AA.

Grapevine on the Move

Steve Grainger's Grapevine Sound and Light operation has moved from its original premises at Lymington in Hampshire to Ferndown - just over the border near Wimborne in Dorset.

Their new premises is part of UK Sound and Vision Limited's base, and the two companies will operate closely in the future, working from the same postal address and using the same telephone switchboard. It is a natural link, particularly for conference and presentation work, where projects require the facilities available from both operations. UK Sound and Vision specialise in AV hire and video production, whilst Grapevine can look after all lighting hire and sales.

Included in Grapevine stock are Parcans, fresnels, profiles and follow spots (mainly CCT), and control includes Zero 88 and Celco boards. Other equipment consists of Astralite trussing and Zodiac towers. A trade counter is also being set up.

Shermann Colts at Deeside

Deeside Leisure Centre at Queensferry has recently been equipped with a new sound system based around the Sherman Audio GX Series Colt 175 loudspeaker system.

The units are arranged in a central cluster over the Ice Rink and driven by HH VX Series power amplifiers. Also utilised is a Symetrix limiter and RSD 8/4 mixer. The installation was undertaken by Sherman Audio's own installation team and had a successful first use during the skating club's pantomime.

On Show at Sound 88

Cerebrum Lighting will be exhibiting for the first time at Sound 88 at the Heathrow Penta Hotel on February 23 and 24. On show on their stand will be the extensive range of **Powerdrive** stands and fittings for speaker suspension, including wall and ceiling brackets. Making its first appearance will be the Powerdrive 'Telehoist' - a wind-up, no fuss stand, capable of lifting heavy speaker cabinets to 15 feet in just a few seconds. Also on stand will be their new range of microphone stands and boom arms.

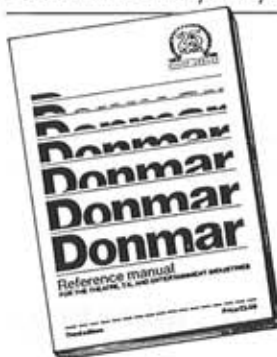
Included in the range of products on the **Bose** stand will be the 402 articulated array speaker with 402E active equaliser and optional SS-5 stand for applications where extreme portability is essential. Used in conjunction with the 802 Series II speaker, the 402 solves the traditional dilemma faced by solo performers: getting the sound of a large system without having to carry one around.

Celestion will show their complete SR compact PA system range, introduced last year and already highly successful. Also on the stand will be a selection of components and finished units from their Industrial and Power ranges including the FPH/T100 20watt flameproof/industrial horn, the FP2 flameproof compression driver, and the R10 flange mounting flare for use with the FP2.

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Taipei Gets It Right

Francis Reid visits Taiwan's new National Theatre and Concert Hall.

A lot of concrete has been poured during the rapid industrialisation of Taiwan, and the architects of most of the new fast-rise buildings in capital Taipei have been required to concentrate on function rather than elegance and style.

But the newly-opened National Theatre and Concert Hall in the Chung Cheng Memorial Park are a model of everything that I ask from a theatre architect. Indeed, I am prepared to declare Taipei an essential positive reference for anyone proposing to build a major arts and entertainment complex.

I say this because of particularly high scores on my standard check list:

- ★ Is the exterior elegant and exciting?
- ★ Are the foyers welcoming and with more than a hint of opulence?
- ★ Does the auditorium feel more intimate than its seating capacity would suggest?
- ★ Does it have that tingling feel of expectancy?
- ★ Does it hang some audience on the side walls, yet give them a reasonable sight-line?
- ★ Are the balconies sufficiently shallow to



The Concert Hall by night.



Concert Hall foyer - richly endowed with marble and grandly sweeping staircases.



Architect C. C. Yang has embraced traditional Chinese styles for building palaces and temples.

avoid the tunnelling effect of excessive overhang?

- ★ Does the acoustic make the performers sound closer than they really are?
- ★ Are the stage and technical areas spacious?
- ★ Do the stage and workshop installations make optimum use of the latest technology both for enhancing the productions and facilitating technical management?

On all these points, both Theatre and Concert Hall stand clearly identified as good news.

The Taiwan Ministry of Education approached the design of the technical installations in an interesting way. They did not follow the current trend of appointing a firm of specialist theatre consultants to prepare specifications and oversee their implementation. Instead, they adopted the older tradition of inviting specialist contractors to design, supply, install and commission. This can be dangerous: on the other hand, it does clarify where the buck stops. To ensure that installations reached the desired standard various methods of supervising the contract were devised. Of particular interest were a series of debriefing sessions during the three-month period of performance commissioning. Every group using the stages during this period was invited to air their

views and to answer a detailed questionnaire on the facilities. (In addition to local Chinese Opera companies, these included New York City Opera, Netherlands Dance Theatre and the Cleveland Orchestra as well as several international soloists playing with Taipei's own symphony orchestras.) Also, a group of independent experienced theatre people were invited to inspect the facilities, attend the performances, and answer the questionnaires. And that is how I came to be there.

The Architect, C.C. Yang, has embraced traditional Chinese styles for building palaces and temples, and positioned his theatre and concert hall within the landscape of the Chung Cheng Park so that they make a tremendously powerful statement, not only as individual buildings but within the context of the urban landscape. The result can only be described as splendidly **theatrical**. With an elegant ease, the exuberant colour and form say all the things that concrete geometry can hardly even begin to indicate. These buildings exude, with confidence and sincerity, the spirit of **come in and enjoy an exciting transforming experience!**

The Park has been created in memory of late President Chiang Kai-Shek and includes his national memorial monument. The site is therefore continuously alive with visitors and the Theatre and Concert Hall have become



National Theatre auditorium. "Although large, perhaps even massive, the scale contrives to remain essentially human."

the number one preferred background for wedding photographs: I counted seven simultaneous photocalls at one point during a day when bridal cars were arriving in virtually continuous procession!

At night the buildings glow enticingly. The floodlighting outside and the massive chandeliers inside combine to attract the audience like moths into magnificent foyers richly endowed with marble and grandly sweeping staircases.

It would be rather negative just to say that the auditoria are free from the usual problems of sight and sound, contact and comfort which can still arise even with today's building science and abundance of soothsaying pundits. So I will be more positive. I will declare that not only are the logical things right, but to sit in these spaces is to realise that they have something more than mere logic. It is a quality that is more common in old theatres. An indefinable mystic. Like the way that some musical instruments speak more readily than others when played.

The Technology

The acoustics and the technical installations were the responsibility of a consortium led by Philips of Eindhoven and G+H Montage of Ludwigshafen. With a brace of subcontractors (including Mittronik for the stage lighting) the consortium undertook design, supply, installation, commissioning and user training.

The core of the agreement between client and consortium was that all equipment and facilities should be of the highest international standard. This being interpreted as meaning that each item should be among the best in the world for its intended purpose.

This created an interesting and somewhat unique situation. Cost was not a major constraint upon equipment standards. That is not to say that money was chucked around; financial controls ensured that all expenditure was monitored for value effectiveness. But it does mean that the project was not subject to the kind of cheeseparating budgetary cuts that are so common in arts funding. It was so heartening to find an atmosphere of 'we want the best and we will pay for it' rather than the more normal 'what is the best we can get for the least cost'.

The technical philosophy is that of a German Opera House. The stage is massively engineered for handling several large productions simultaneously. Rear and side stages have similar areas to the main stage. The rear stage includes a revolve turntable and the side stage is in the form of wagons. Complete sets can be prepared on these stages and rolled on to the main stage where, since that main stage is composed of elevators, they can be lowered flush with stage level. Complete or part scenes can also be dropped on these four stage elevators to the understage area where there is a further option of shunting them back into a lower rear stage. And these understage areas are deep enough to take full height scenery! Flying is by 30 computer controlled motorised sets and 20 hand-worked counterweight sets.

Orchestra pits are formed from twin elevators which also offer apron stage or extra seating options. Music stand lights are fed by jack-plugging into abundant sockets flushed into the pit floor; a welcome alternative to the usual spaghetti.

The major on-stage lighting position is a bridge flanked by a pair of lighting towers. This bridge and towers form a false proscenium with variable height and width.

There are a further three dedicated lighting bars over the stage, carrying spots and battens, plus a cyclorama lighting bar. (There is available, of course, a vertically rolling cyclorama which can track out from its upstage corner home to surround the stage from downstage left to downstage right.) Electric hoists allow lighting ladders to be positioned in the wings wherever required.

The auditorium architecture did not lend itself to positioning a full series of ceiling lighting bridges to give a comprehensive range of angles. However there is a good position to the rear of the theatre auditorium plus a forward one incorporated within the central chandelier mounting. In the concert hall, sections of ceiling drop down to reveal FOH positions; although for the concert platform the main requirement is the blaze of flooding downlighters. Side lighting in the theatre is from an accessible wall slot offering good angles from a position adjacent to the pit rail.

The spotlights are heavily engineered in the German tradition of a permanent rig whose lights are not intended to be moved. The rig uses instruments of appropriate types and beam angles in the various positions. I would be happy to light most shows with the permanent rig as hanging, particularly since it includes a good collection of low voltage beamlights and an abundance of Svoboda backlights. However, it must be about ten years since I lit any show without parcans: and there is an acknowledged need to acquire some lighter weight spots suitable for quick temporary rigging.

Lighting control is by Mittronik Datolux, a system based on Israeli software in an operational package which appears to my eye to offer comprehensive facilities yet be markedly operator friendly.

The sound installation seemed to me to be pretty comprehensive but then I am a mere lightperson bemused by sound technology in its current explosive growth. However, the inventory is a comprehensive one with a Studer 40 into 8 mixer at the heart of the theatre system. Recording facilities are based on a Studer 24 track. And what, in the kind of theatres that I usually work in is a simple closed circuit TV circuit for stage management and late-comers, becomes in Taipei a full video studio set-up.

Rehearsal rooms, dressing rooms, offices and such ancillary facilities appear to be sufficiently generous. There is a splendid recital room adjacent to the concert hall and a studio as uninviting as only a black box can be.

There are many reasons why Taiwan's National Theatre and Concert Hall are such a success and I hope that I have succeeded in pin-pointing the major ones. There is, however, one key overriding factor. Everything is in scale: there are no excesses in one direction at the expense of inadequacies elsewhere. And although large, perhaps even massive, the scale contrives to remain essentially **human**.

Architect: C.C.Yang & Associates

Client: National Theatre and Concert Hall Management & Planning Council (for the Ministry of Education)

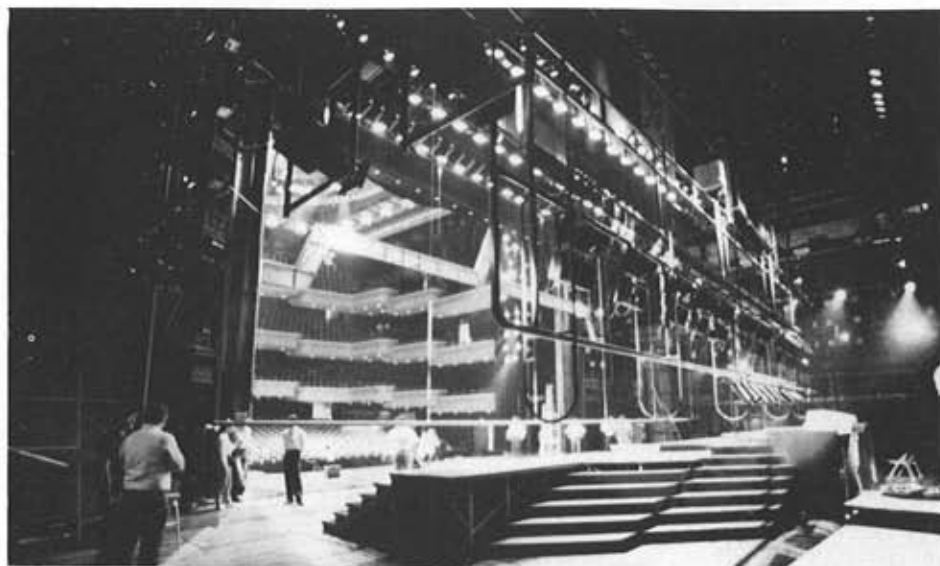
Consultant: Sinotech, Taipei

Builders: RSEA, Taipei

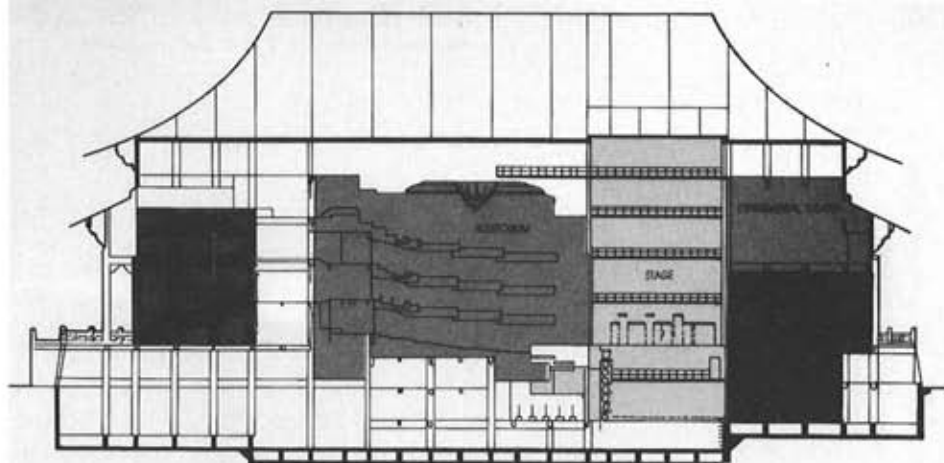
Design and installation of acoustic, stage and lighting systems: A consortium led by Philips, Eindhoven & G+H Montage, Ludwigshafen.

Specialist Sub-contractors to the Consortium:

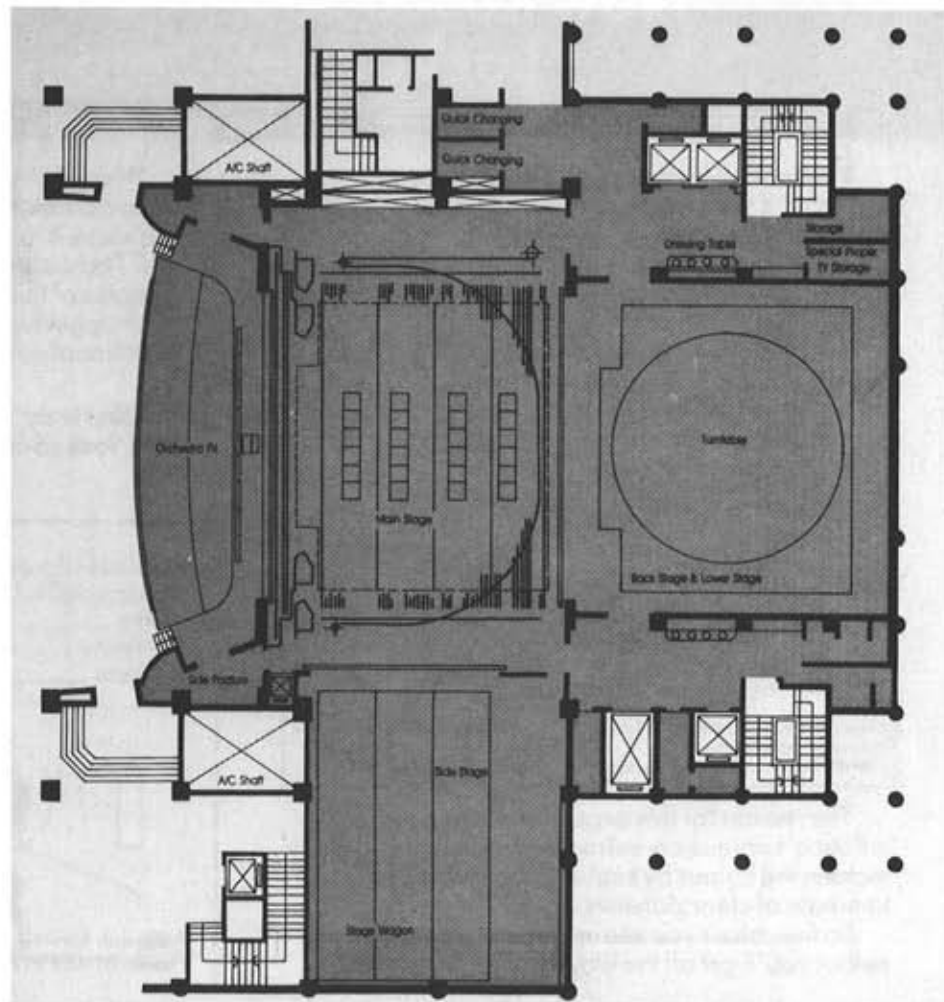
Climatic: TKT, W.Germany
Acoustic: Werner Genest, Ludwigshafen
Stage Engineering: Man, W.Germany
Stage Lighting: Mittronik, W.Germany



Backstage at the National Theatre.



Section through National Theatre (above) and plan of stage area (below).

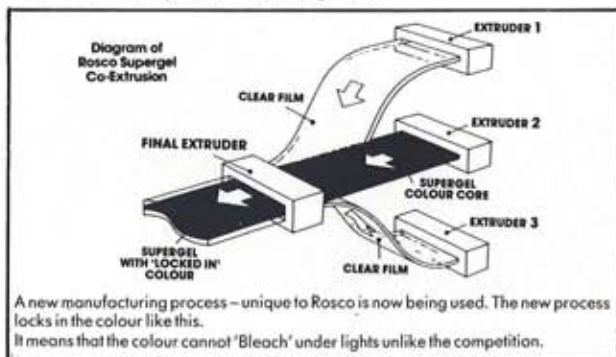


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Alan Ayckbourn - Technically Speaking

Alan Ayckbourn's 34th play - 'Henceforward...' - has just left Scarborough's Stephen Joseph Theatre in the Round for a tour to Germany, Poland, Turkey and Egypt. John Offord visited the theatre as final preparations were being made for the production's conversion to proscenium format, and talked to Alan Ayckbourn about his involvement with things technical . . .

Working in a theatre form that demands a very intimate relationship between the components of a production, Alan Ayckbourn's involvement with all technical aspects of theatre is well known. I asked him where this interest had its beginnings.

"I started at the point where tape was just creeping into theatre, sound-wise. I was at Oxford Playhouse at the time, and they used those old panatropes, 78 discs, and this rather dicey cueing system. As I had been given an old Grundig tape recorder as a kid, in addition to being the junior ASM, I also became the sound expert!

"I remember that they purchased a tape recorder, and I started to produce taped sound - it was very primitive. Later, I came here with Stephen Joseph, who was a technical nut. He loved the nuts and bolts of theatre completely. He and I together began to explore the use of taped sound, and it culminated a few years later at Stoke-On-Trent with 'Mr. Whatnot' - which was, and in fact still is, a fairly sophisticated sound tape against which actors acted. It was really a sound operator's showpiece!

"Simultaneously, because the theatres I was working in were so small, I was getting involved in lighting. Again, it was learn-as-you-go. Lighting in the round was something that hadn't been approached in detail, and Stephen and I worked out certain theories on angles, and so on. We progressed a long way, because when we started I think we had just eight pattern 23's which had to light



Alan Ayckbourn - "fascinated by the technical side of theatre."



Alan Ayckbourn's first full venture into computerised lighting was with the purpose-built system installed at Scarborough by Statelight in 1980.

a whole show. Our technical facilities were terribly slender, but it was amazing what you could do. We had a crude slider dimmer board where we cross plugged at every cue - so it was all fairly simple.

"The result was that I became fascinated by the technical side of theatre, and this fascination has remained with me, and I'm still involved. When you have lighting designers like David Hersey or Mick Hughes whom I work with a lot, as long as I allow them their artistic freedom I think they like my involvement. I'm certainly very interested!

"I like to know what's happening, and I have very definite ideas - although sometimes I'll say 'find out how to do it and that's the image I want from it' - and the same goes for sound. I'm still involved, particularly in Scarborough, with sound. I have a small studio of my own at the top of the house which has got an eight track, a four track, and two twin tracks."

You are a playwright who believes in the total concept of theatre, drawing together many aspects, and most particularly the actors and the technical. At what stage do the technical elements come up for consideration during the writing of a play?

"They are there all the time. They are there because rarely do I write a play without knowing that I'm going to direct it. So there's a part of me always checking to see that it's possible, or at the very least, feasible. I may not have solved it completely - and in fact it's quite exciting not to have every solution pat by the time you've finished a script. When I write a play like 'Way Upstream' I made certain that it was possible to get water into the auditorium here, which it was, and that it would stay here and also that we could control a boat. The details had to be worked out fast, but nonetheless I was getting a buzz from the thought of that side of it as much as the play itself."

The technical element obviously excites you. To what extent, if any, do you throw it in deliberately?

"I try not to say 'Here's a good effect, let's write a play around it'. My theory of writing is that a play is a meeting of ideas. There are primary ideas like what it's about and the development of the characters and the situation of the plot, but almost as important, and in some ways just as important, is how you tell it. As they say, there's nothing new. What there is are different ways of telling things, and so I bend my mind very much towards how to re-tell that story; how to tell it in a different way.

"For instance, with 'Intimate Exchanges' it may be 16 endings, and with a play like 'Way Upstream' it has to do with using the boat as a symbol of what everyone wanted to say, and so on. Neither one or the other is dominant, and equally I would not start a play

unless I had a damn good framework for doing it in."

I understand that working in a smaller community here in Scarborough, rather than in London, has certain benefits when quizzical interest from the local community can respond to problems with a production?

"It doesn't generally start off like that, but it was exciting with the 'Way Upstream' experience when various elements pulled together. We asked a local boatyard to provide a 'sawn off' boat, for instance, and local interest certainly caught fire with this show. It was not an easy project, and it was trial and error.

"It was a new technology to move bottomless boats with motors through water - albeit only ten inches of it. With a varying number of people on board it required a great deal of work with gears and motors. If the motor was too strong the boat shot water everywhere, and if it was too feeble it started to catch fire. Our poor engineer was rushing backwards and forwards trying different strengths of motor and various gearing. When it worked, which thank heavens it did on the first night, there was a sort of sigh of relief from the entire audience followed by a huge round of applause. A sort of 'thank you, God' followed by applause."

The current production of 'Henceforward...', your latest play, intrigues me. It has a very simple set, compared with many of your plays, but at the same time it involves the latest technology, and is set in the future.

"The set came about because I was trying to write about a creative artist, which is always a dangerous thing to do because creative artists are notoriously difficult to portray on stage. A composer seemed to be a good idea. I had worked quite a lot with Paul Todd, who is the resident MD here, and over the years we've used a lot of the latest music technology. Before I started to write we investigated the state of the art in music computers, and in this case we went to look at a Synclavier, of which there are only about two or three in the country. It is a fascinating



Getting to know computers. Alan Ayckbourn (seated) takes the original cast of 'Henceforward...' to look over the systems at Scarborough Building Society.

American machine, and a very clever programmer showed us around it. We saw about a fiftieth of what it could do in about three or four hours. It convinced me that it was the sort of machine that would suit my purposes, particularly as I was intending to push the play a little bit into the future.

"The nub of the play asks to what extent is an artist justified in pillaging his personal life in order to express himself throughout. In the end, doesn't he destroy his personal life, and how much does art matter over human relationships?"

"In the play the composer records everything that happens around him and he creates his music from the verbal and the sounds people make - which was very nice for him and quite infuriating for everybody else! In the end he alienates everyone around him.

"This was the starting point. It was then a



Jerome has difficulty with troublesome robot NAN

matter of actually recording this, and getting the Synclavier to do it for me. I think we have about five minutes music in all the show, but it took at least eight weeks to produce. One had to use a little dramatic licence and advance the state of the art a few years!"

You've also involved Jerome, the composer in the play, with the 'technical' side of the show.

"Barry McCarthy has actually learned the music quite closely, and a lot of people believe he played it - although I don't think people with a sufficient knowledge of the technology would think he did! It's also a play about people, and what we do to people - as indeed most of my plays are, and to that extent I've put mechanical people in 'Henceforward...' as well. There's a mechanical woman the composer lives with, and she's very unreliable. (I like the view that technology is rather unreliable - and I loved the spaceships in 'Alien' that looked like clapped out machines!) NAN 300F is a sort of British Telecom version of a robot: she's a little erratic, and has developed several nasty faults, and like all good things, they've stopped making spares for her.

The Technician's View

Michael Thomas has been chief technician at the Stephen Joseph Theatre in the Round, Scarborough for two-and-a-half years. His background ranges from working in several of Britain's major producing theatres through to major concert touring and presentation work.

He considers Alan Ayckbourn the best director he's ever worked for. "Aside from his plays, I've enormous respect for him as a director," he told me. "He is stunning. Although he's the only one who knows exactly what he wants on stage, he will take notice of other people's comments, and often incorporate their suggestions.

"He gives us very good stage directions on the script. Then we get another good insight on the read-through when everyone is involved. At that stage you've got a good idea of where he's at.

"You could say most people working here are over qualified, but Alan Ayckbourn stretches the entire building every time he puts on a new play. He is also an excellent director of other people's work, a factor of which a lot of people are unaware. He has a very intimate rapport with all the people he works with.

"On the purely technical side, he knows as much, if not more, than I do. He's very technically minded, and he's certainly one of the best sound operators I've known."



Chief technician Michael Thomas pictured on the set for 'Henceforward...' with assistant technician Jackie Staines.

"So I think there's a nice parallel there. In a sense I tried - being aware that at the words 'science fiction' some people tend to climb on a chair and scream, rather like plays about soccer - to make science fiction user-friendly, and to that extent I think it has worked. It doesn't seem to have upset too many people!"

'Henceforward...' is going off on tour prior to its West End opening in the autumn. Where will the production play?

"It's going first to the Lyceum Theatre in Crewe before touring to West Germany, Poland, Turkey and Egypt and then it has a small break before a number one tour of the UK in places like Bath, Norwich and Wolverhampton. It winds up in Scarborough in the summer, and then I will re-rehearse it in September prior to its opening in the West End in November."

It will obviously be staged in a proscenium format, and it does seem to be a much easier play to produce on a proscenium stage compared to some of your previous Scarborough-originated plays.

"What we are doing at the moment is rehearsing during the daytime for the pros. Actually it isn't that difficult to do, and in some ways it's easier. Some of my plays lose a lot coming out of the round, but this one much less so. The set we are designing for the tour and for the summer is basically the set we will use in the West End."

Moving to more general matters I am interested in your views on how the technical side of theatre is developing, and how you see its role.

"It's changed out of all recognition. One's seen the rise of the lighting man; he was always there when I started, but barely on the poster. They've crept slowly up in prominence, as indeed has the technology. Obviously with the change of lighting boards it has become much higher technology than when I started, and there are some wonderful lighting technicians around. I think that given the opportunity their creative input can be enormous - invaluable. I suppose how much they are allowed to do depends on how much the director allows them in. Personally, I would not conceive of a production without having at least a space for a brief for a lighting designer. Sometimes we have to say 'terribly sorry, it's just the one room, and it's daylight, and it's a straight up and down'. On the other hand, at the moment I'm working on 'Tis a Pity She's a Whore' at the National Theatre, and I was rather pleased to set lighting designer Mick Hughes so many headaches because I knew he would enjoy solving them!

"With sound, of course, the whole world has changed. Certainly to have recorded sound effects on compact disc is going to be wonderful, rather than having to buy a new copy of the 33 every time you want to dub a change. And of course it's even rather old hat to use disc now. Most self-respecting technicians pick up their equipment and wander off to record effects themselves on tape.

"It has been particularly true for me, working in the round where scenic possibilities are limited, but where light and sound are doubly important. I use a lot of what I call the permanent background tape, which has to be very carefully balanced, wrapping the audience into a sort of ambient feeling - particularly with things like the 'garden plays' I have written."

There's a little story about the blackbird that flies around during one of your plays.

"Yes, it was in 'Intimate Exchanges'. It flew all



The latest from Alan Ayckbourn: the set for 'Henceforward...' at the Stephen Joseph Theatre in the Round, Scarborough.

around the auditorium - we panned it all over the place! It used to fly gently around. It just added something. Few people noticed, but I'm sure the odd ornithologist went 'ah!' as it moved again!

"I think one of the most successful tapes was produced by Rob Barnard in London for 'A View From The Bridge', when we took great delight in blending sounds to undercut the outside scenes. What was lovely was that people actually noticed it in the right way, and said 'gosh, those footsteps dropping in were just right'. It adds a depth to a show, and we are very lucky in working with people who respond. I look for people like that to work with, and I also think they'll find you. They say, 'this guy's interesting. He doesn't just say give me a dog'. What I say is 'give me a dog growling, or a dog running away'. That makes it much more interesting."

You are currently directing at the National Theatre, and also popping back to Scarborough on occasion. How do you cope with directing in two totally different venues, at different ends of the spectrum?

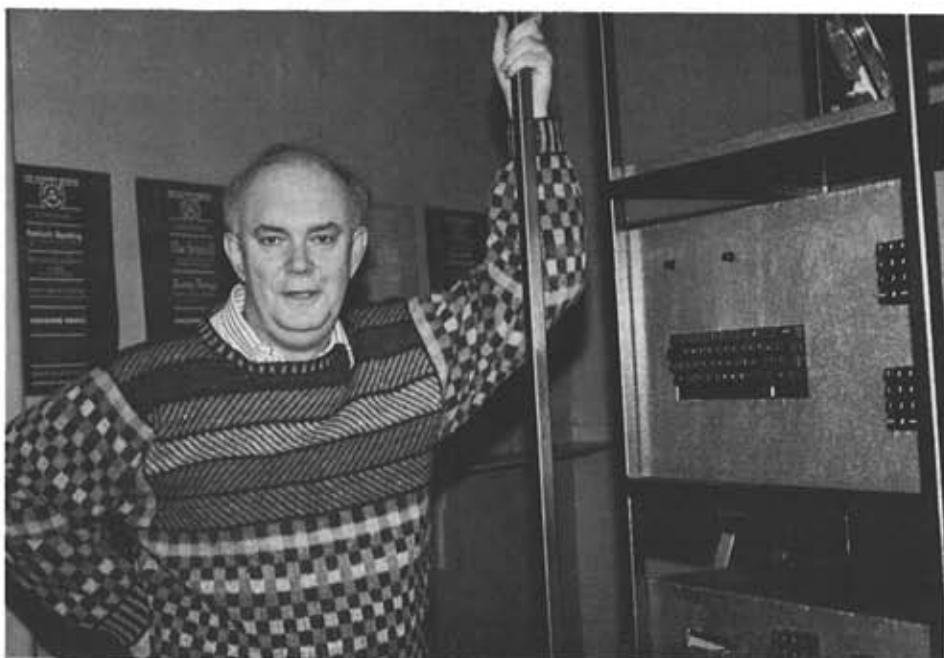
"Obviously at the National you have got a lot more people at your disposal, whilst at Scarborough I tend to take a lot of the sound on myself and let Mick Thomas get on with the lighting. He can obviously do both, but it's asking rather a lot. At the National people

are paid to do it, and I think they would be a little hurt if they weren't allowed to! I'm quite happy. I don't mind if I do it or not - as long as I get what I want in the end. It is a luxury at the National. You can ask slightly more down there, and you can also say, with the length of rehearsal time available, 'run me up some stuff and we will have a look at it'. If we hate it we can wipe it and start again. Up here, with only four weeks available, we've got to make sure it's more or less right straight away. We can't do too many dummy runs!"

"I believe since I first discovered Alan Ayckbourn's work in the early seventies that I had also come across one of the twentieth century's greatest theatre technicians. His ability to bend time, space and emotion on stage to throw new light on all our lives is actually a measure of his craft. The excitement for me in selling our theatre is perhaps best expressed now by contemplating a package of shows for 1988/89 which out of a total of nine productions will include no less than eight world premieres.

"It's the finest of world theatre - and very exciting."

Russ Allen
Marketing Director
Stephen Joseph Theatre in the Round



Alan Ayckbourn pictured with part of the set for the touring production of his latest play 'Henceforward...'

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. . . there's JEM Smoke Machine Company Limited. John Offord took a trip deep into rural Lincolnshire to check out progress on Heavy Fog . . .

One of the innovative high spots of the 1987 PLASA Light and Sound Show last September was the industry's first view of JEM's 'Heavy Fog' - and the telephones haven't stopped ringing with orders and enquiries ever since. In just 12 weeks or so from now full production of Heavy Fog machines will commence, and the demise of dry ice will begin.

Nigel Morris, JEM's founder and owner, has been in the entertainment business for over 22 years, and started with four mobiles, booking gigs and promoting them and acting as a jock himself almost every night of the week. He then joined Roger Squire at his Junction Road office in North London, eventually becoming sales director for the organisation.

After seven or so years he left to form his own company, importing and distributing selected lighting products such as pinspots, mirror balls and helicopters. He spent two years doing this and at the same time started to research fog fluids.

"We'd realised earlier that there was a need for certain types of fluid that needed developing and we spent a lot of time on this. We ended up selling fluid all over the world," he explained.

"Subsequently, many of these companies said to us: 'Why don't you manufacture a machine?' They had all been well pleased with the fluids we had made, so we went into research again and eventually came up with our model ZR40 machine."

By now Nigel and June Morris had moved house to Lincolnshire, purchasing part of a farm, and the outbuildings became the manufacturing areas for JEM Smoke Machine Co. Ltd. Over the past four years they've built up a range of smoke machines for the discotheque and commercial markets.

"We have an extensive range to suit many different applications," said Nigel Morris. "They aren't just boxes. Over 40% of our business is commercial, and on this side we supply to fire brigades all over the world, to navies, and to the Army. A lot of our equipment is also supplied to people like British Aerospace who use it for development and training purposes. It also goes to companies manufacturing flight simulators. Our equipment is installed in Boeing 727, 737, 747 and 757 flight simulators.

"The discotheque market is where we started our business and it is still the most important part, but certainly the commercial world gives us a very regular base of business."

1987 was a highly eventful year for JEM. They'd launched 'Smoke Detector' at SIB Rimini in May, had seen Heavy Fog become a national name overnight in September, and in November they moved into their newly acquired freehold premises at Spilsby in Lincolnshire with 13,000 square feet of floor space available for further expansion.

A fourth factor now comes into play. Also in November, Nigel Morris launched a new company - JEM Pyrotechnic and Special Effects - and this operation will take over 4,000 square feet of space at the new complex.



Nigel Morris with Heavy Fog - the first industry view at the 1987 PLASA Light and Sound Show.

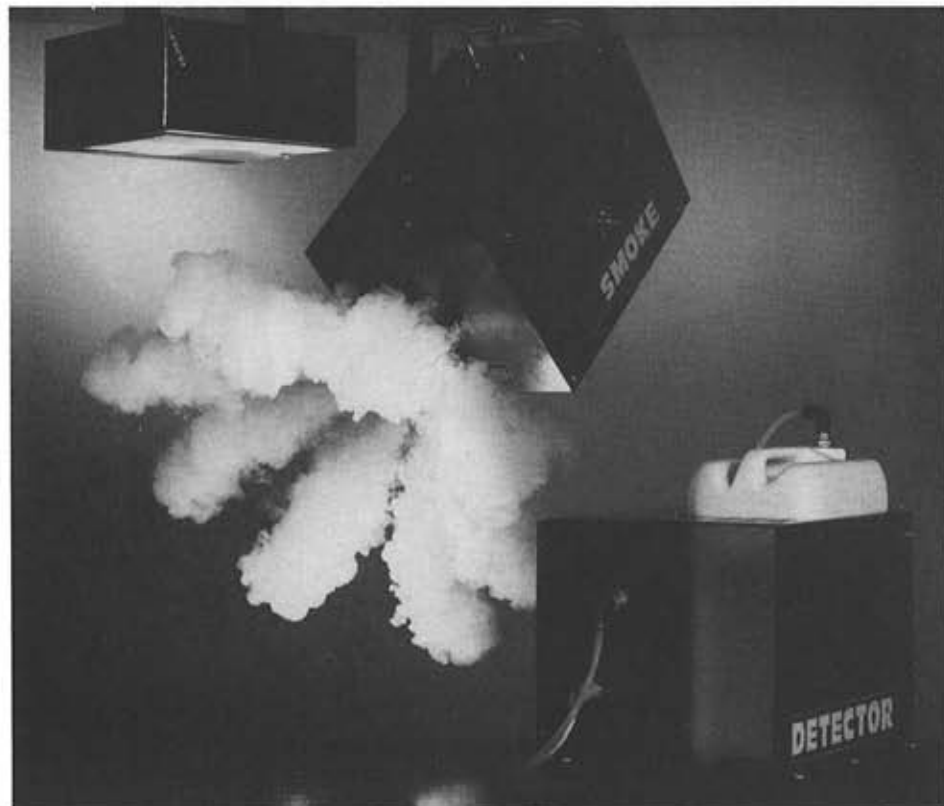
"Several things happened to persuade us to form another company," explained Nigel Morris. "Many people were calling us from the commercial world to ask for special effects. Theatres would ask us for special effects, and we were also being asked to produce firework displays. Then Heavy Fog came along."

I asked how long Heavy Fog had been on the drawing board.

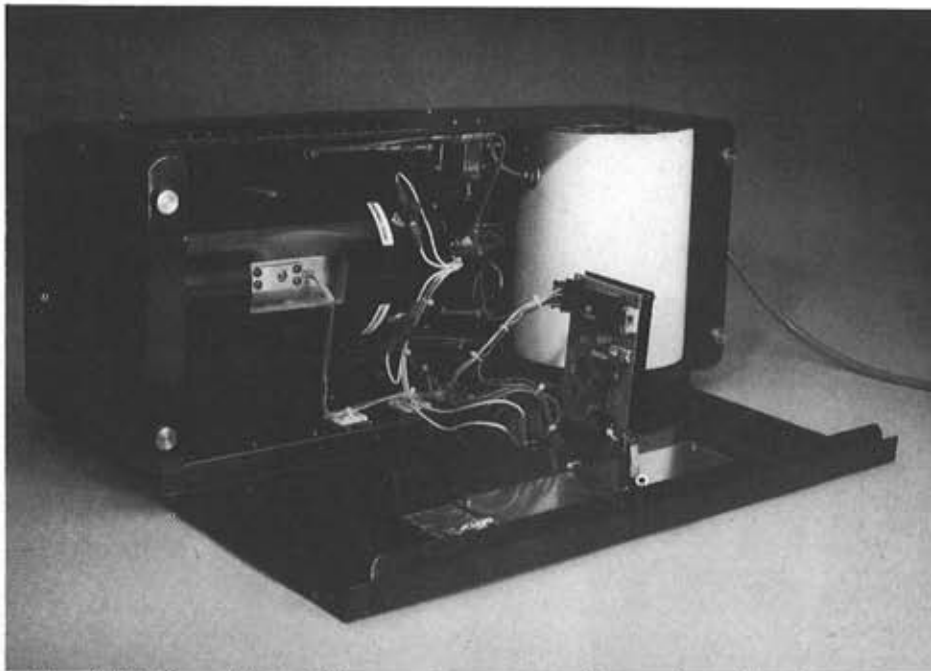
"We'd been thinking about it since we

started making smoke machines - from day one. The real problem was how to do it, and the investment costs involved. About 18 months ago we started experimenting with various kinds of systems for generating cold temperatures. I'm sure many people have been thinking about it for years, but until now no one's done anything about it.

"All along we knew we could do it, but it was a question of time and money - and the space - to develop the concept.



Smoke Detector, JEM's new high power auto sensing smoke system was launched at SIB Rimini in 1987



Inside a JEM ZR41c solid state high power fog generator. Most smoke machines have over 200 components.



A familiar face in the industry - JEM's production manager David Barker.



Nigel Morris shows off a Smoke Detector unit in JEM's manufacturing area.



Monitoring tests on the prototype Heavy Fog machine in JEM's Pyrotechnic and Special Effects section at their new Spilsby complex.

"Heavy Fog is currently running at an investment cost of £30,000, and the test equipment is very expensive. We have developed a refrigeration plant that reaches very low temperatures, and the fluid has also been developed specially. The smoke is made in the conventional manner through a smoke machine and is then frozen down to a very low temperature. The machine itself is very complicated and we have two people working full-time on its development.

"The system is currently being tested under various types of load to see how it reacts to various ambient temperatures created by extremely hot smoke. There are 12 probes on the prototype at the moment, and we are carefully monitoring all the results."

JEM will be able to manufacture 60 Heavy Fog machines each month, and there is a big queue of customers awaiting the first output. Officially called the Heavy Fog HF2000, the new machine can also be used as a conventional fog machine using JEM ZR smoke fluid, and a mix of the two fluids can be adjusted to give varying levels of heaviness to the smoke. Up to four lengths of ducting hose can be attached to individual outlets on the front of the machine, and each can be independently turned on or off as required. Wheels make it easily manoeuvrable.

Up to 200 components make up a smoke machine, and Nigel Morris's view is that they should only be used by professional users. "There are many different sciences involved in a smoke machine of any kind. Alloys reach 300°C, and are regularly expanding and contracting. We have heating units, temperature control, electronics and fluids, and all these



The ZR20 portable fog generator.



Manufacture in progress - JEM now has a total of 13,000 sq. ft. of space at its Spilsby base.



A batch of 'Le Fog' machines reach the final assembly and test area. Test engineer in picture (right) is Tony Holland.

elements are very difficult to get into one box and made to last for a long period of time.

"We are happy to give a five year guarantee on our products, and I believe we are the only people in the world to give a guarantee that long.

"Our company is set up specifically to make smoke machines and does nothing

other than make smoke machines. And that's where the expertise comes in. If we can't be the best at it, then something's wrong!"

Exporting is a top priority for JEM, and about 65% of all product goes overseas. And the future looks very exciting. Ten extra permanent staff will be taken on over the next six months just to cope with Heavy Fog, and

coupled with that major improvements are being carried out to the new complex.

By early summer both JEM companies will be firmly in the industry's eye, with sparkling new reception, administration, manufacturing and test facilities.

And, of course, Heavy Fog HF2000 will be all set to give them a hefty launch into the future - complete with appropriate effects.

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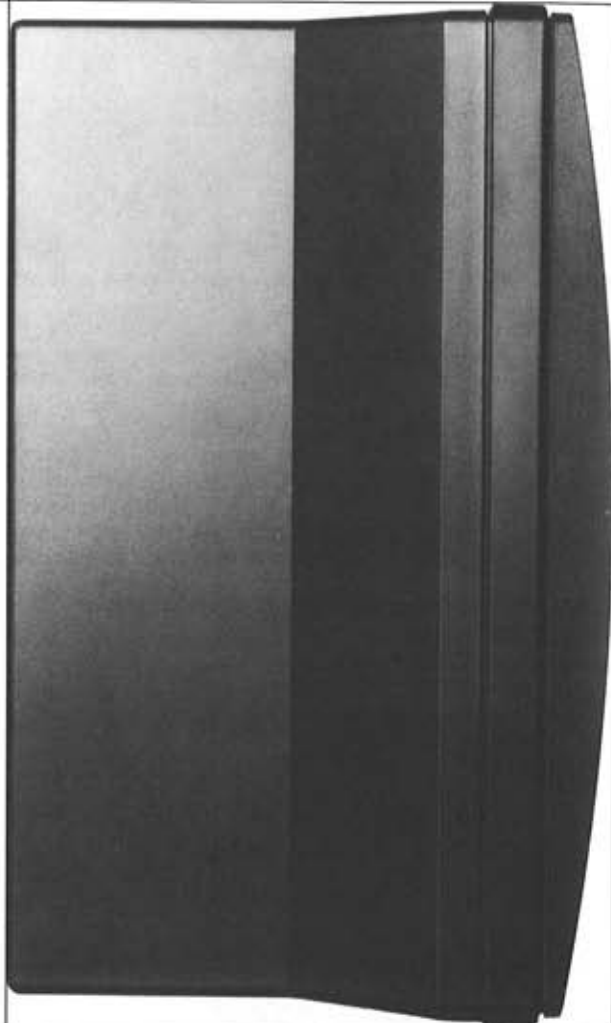
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Behind the Scenes at the Manufacturers

David Weatherall visits four PLASA member companies involved with the manufacture of electronic products for the entertainment industry, and finds out how they have become international experts in high quality small-batch production, tailored to suit customer's precise needs.

We've all got problems: venue managers have problems, installers have problems, rig designers have problems, retailers have problems. But I feel for the poor manufacturer - he has the biggest problems of all.

The manufacturer has to design good, reliable, marketable products; make them properly, provide good customer service, fight off the competition and make a profit - all at the same time!

If he gets any of those things wrong, he goes to the wall. Getting them right is not just important - it is essential.

Fortunately, Britain is in the forefront when it comes to the electronics side of the entertainment lighting and sound industry, and PLASA members are getting it right. How has it been accomplished? I visited four PLASA companies who have a strong electronics product line, to discover the secrets of their success.

Zero 88 Lighting Limited

Zero 88 was started in 1972, in an attic. The original four partners all had an engineering bias, so although the company made good products it grew only slowly until 1976 when a sales manager was appointed. Then things started to take off. Since 1981 they have been growing at around 25% a year, and about two thirds of their production is exported.

Zero 88 has a wide range of products - from small power packs to the Eclipse modular lighting control system. The usual products number around 60, with three or four variants each, and the Eclipse range adds another 80 items to the list. "The main difficulty is supporting all the market-places, all with the right products, and all at the same time," said Peter Brooks, the company's managing director.

Doing that takes a lot of organising, so just a year ago they installed additional computerisation to help in controlling their work. Orders are typed into the computer as they arrive. The computer then calculates when stocks of those products will run out, and prints recommendations on what to manufacture next. Manufacturing needs raw materials, so they have to be ordered in good time. The computer prints out a schedule of orders which takes that into account, so that the needed components are present on time - without being too early.

"The resulting improvement in control," said Peter Brooks, "doesn't only apply to us. People across the country are thinking about their businesses, and how they can do it better. Our new system, with programs we wrote ourselves, has enabled us to decrease overall stock by up to 20%, whilst at the same time we have increased output by 35%. It has also changed the balance of stock. We used to hold vast quantities of



Citronic Limited's MPX 9-31 top of the range 'no compromise' mixer.

parts and part-finished products, whereas now it's much more in actual finished product."

Work in progress (partly completed work awaiting the next production stage) has also been reduced "from three or four weeks to half a day." As space is at a premium in

Zero 88's St. Albans factory, the reduction in the piles of part-completed products has been a great help.

Of course, before anything can be made it must be designed. Designing any electronics takes time, but much of it is sheer slog in drawing diagrams and planning how to lay



'Technology in Control' - the message from NJD Electronics of Nottingham.

**Heads from Zero 88's Computer
Production Schedule:**

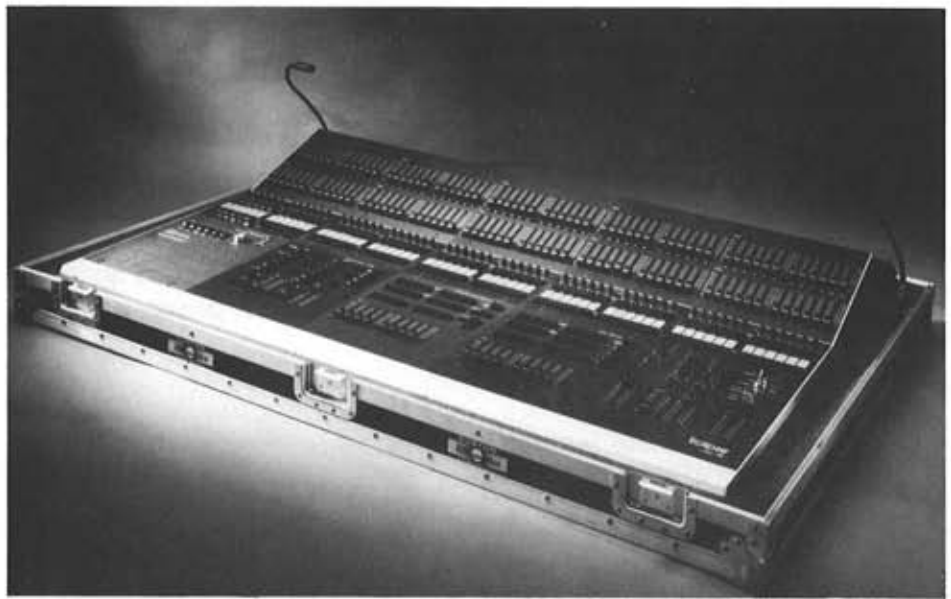
Production Number
Description of product
Balance in stock
Planned to make
Long mean (52 weeks)
Short mean (13 weeks)
Minimum stock level
Out time (in weeks)
Order quantity on factory
Man hours for batch
A 'star' column for priority
(The Minimum stock level and Order quantity
on factory are calculated statistically.)

out the components and wiring tracks on the printed circuit boards (PCBs). Here also, computer technology comes to the rescue - with CAD, which is used extensively at Zero 88.

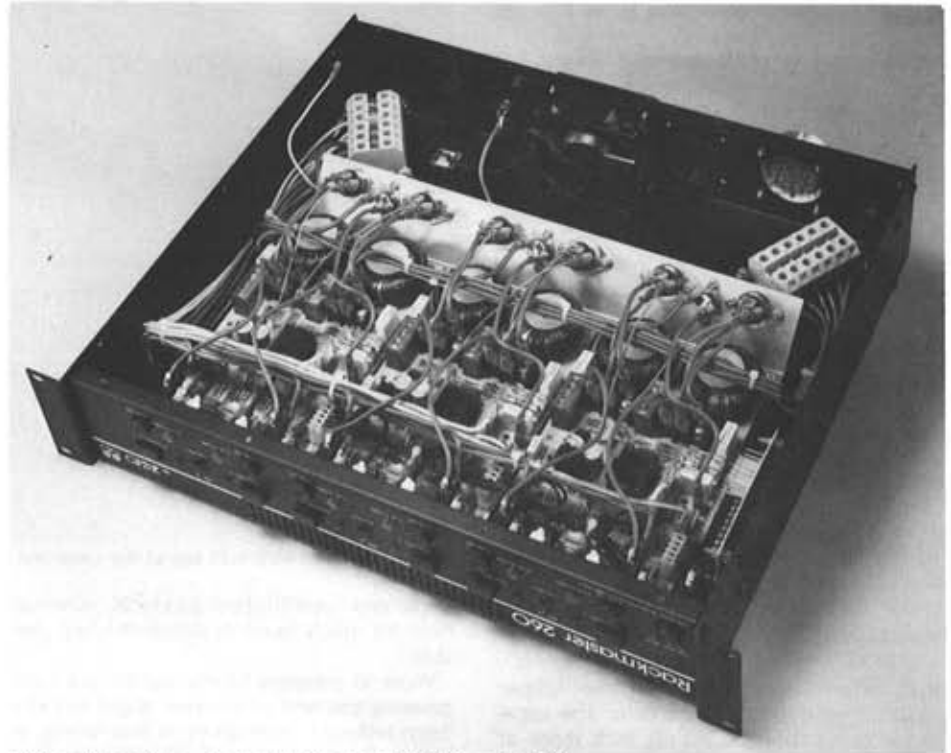
CAD is short for Computer Aided Draughting (or Design, depending on who you talk to). Circuit diagrams and physical component layouts can be drawn directly on a computer screen. That is no faster than drawing it manually, but once the drawing is in the computer, amendments can be made much faster using the computer than can be done by hand. In addition, if the computer is told which components are connected to which other components on the circuit board, it can further reduce the tedium by having a stab at deciding where the printed wires should go. Once that job is done (with a bit of human help), it can even produce a drawing to be used as a master copy for making the PCBs themselves.

That speeds things up - especially when changes need to be made at late stages in the design process. But where this system really helps is in imposing discipline on the designers. Many electronic products reach the market-place with the original circuit diagrams virtually drawn on the backs of envelopes, so dealers can't make needed information available to purchasers. CAD, however, forces the diagrams to be drawn correctly long before the circuit is produced. That improves the product documentation, which itself improves customer service.

The design is very important in other ways. The Eclipse lighting control system, for example, is designed to be modular. That design decision has resulted in quite



A flight-cased Eclipse - Zero 88's renowned modular lighting control system.



Tidy and accessible - the 'inside' of a Zero 88 Rackmaster 260.



Running a test programme prior to 'hot room' treatment.



Above and below: two sections of Zero 88's assembly areas at their St. Albans factory.



Computers aid all processes at Zero 88 from preparatory work (above) through to labels for despatch (below).



remarkable customer service. Zero 88 can often provide a custom-made Eclipse within 48 hours, by putting the modules together almost as if it were Lego.

But before any item can be sent to the customer, its reliability needs to be confirmed. The most usual way for electronic products to fail is through getting too hot, so at Zero 88 each completed item is left on in a hot (86°F) room overnight. After having spent the night in that room, the unit is tested again. If it passes the tests, that piece of equipment will prove reliable in the field, and it is ready to be packed.

Naturally, any failures at this stage cost money to rectify, so it is in everyone's best interests to ensure that the final test is little more than a formality. To quote Peter Brooks: "At the moment (touch wood) it's not catching much at all, which is good news! And there is precious little returned - it's so small an amount we don't even count it."



NJD's Kevin Hopcroft: "We are serious about the industry, and we are doing things properly."



Alan Bolton, production manager at NJD, co-ordinates a finely-tuned manufacturing schedule.



NJD's Nottingham base is soon to be doubled in size.



Computers play a major role at NJD - even with simple tasks such as cable cutting.

N.J.D. Electronics Limited

A smaller company, with a turnover of roughly £1 million a year, is N.J.D. Electronics Limited, based in Nottingham. They are such a good success story that their bank has made a video about them - but at the start they weren't so well known.

Kevin Hopcroft and his partner, Brian Binns, set up N.J.D. Electronics Limited in 1973 and became contract electronics manufacturers. From their factory came all sorts of controllers to be marketed under other names - Squire, RSC, Venue, Damon, Norman and others. Then, in 1980, they put their own badge on some equipment: the SA220 sound amplifier and some popular lighting controllers (the SC4000 among them). The same year they shared a stand at the BADEM exhibition.

That was the turning point. Kevin Hopcroft explained: "People kept coming up to us and saying 'Oh, it's you! We've been wondering where these products came from.'" Since then, the company has developed well and is currently growing at around 18% a year; and now that the name is known in Britain, N.J.D. are also attacking the export market. Their first exports were made in 1984, and have grown to represent about 10% of their total output, exporting to 12 countries. Plans are also under way to acquire the premises next door, which will double their factory space.

Reliability is very important in any product, as the people at N.J.D. are well aware. For that reason, only branded components are ever used in N.J.D. equipment. "It's simply not worth it to save a few pennies on cheaper components when they are not so reliable," says Kevin. "The customer must be able to rely on the equipment working."

Another factor in the quest for reliability is the number of separate items in a product. The more items, the greater the number of

Three in the NJD range . . .



Logic 8000 - 'total lighting control for all applications'.



The M400 Mosfet professional power amplifier.



The Mk1 Lancaster twin deck console.

things to fail - even including things like wires. For that reason, as much inter-connection as possible is done by using the printed circuit board, and wires are kept to a minimum. Not only does that reduce the number of potential fault points, but assembly time is also reduced, which helps keep the price down.

Every piece of equipment leaves the factory thoroughly tested. Each circuit is tested once assembled, using equipment with electrical characteristics matching those found in real use. Once confirmed as working correctly, the circuits are then assembled into the casing and wires attached to the bits and pieces inside the cabinet. But before screwing it all together it goes to the final test area, where it is tested with real lights and sound to ensure everything is working perfectly. Only then is the cabinet finally screwed shut and the unit packed. The customer can be confident the equipment will work first time out of the box.

N.J.D. make 60 products that carry their own label, plus another 30 or so manufactured for others, with each product having three or so variants, making a total of almost 300 products. But the space available is only enough to make five different products simultaneously - which means that properly organised production is essential!

To help with that, computers have been brought into the N.J.D. offices. Kevin and Brian ran into difficulties when they first tried to find some programs with the facilities that they needed. There just weren't any available, so they sat down with some software people and designed the entire system from scratch. Now orders are entered directly into the computer, which immediately allocates items in stock to that customer, decides if any more need manufacturing and decides when they should be made. It also helps with scheduling production, as the time needed to make any item is known by the computer. Multiplying the time needed for one item by the number of items in a batch gives an idea of how long that batch will take to manufacture. Priorities are also advised by the computer, and that information is very useful in deciding what to manufacture and when.

Efficient production isn't just about computers, though. People are important, and



On test at NJD, using one of the company's in-house designed and programmed units that asks all the necessary questions.

good quality work can't be produced by untrained people. So N.J.D. take on some YTS employees each year to start a two-year course. To date, every one who has completed the course has been taken on as a full-time employee. That's good news for N.J.D., and good news for the local youngsters, too.

Pulsar Light of Cambridge Limited

Pulsar Light of Cambridge Limited is a larger company, started in 1970 in a bedsit and now situated in a 20,000 sq. ft. factory turn-

ing over £3.5 million a year. They make lighting controllers, lanterns, strobes and disco spots - over a hundred products, each with four variants, making a total of 400 products. In the past few years they have been growing at around 20% a year and two thirds of their production is exported - mainly to France and Germany.

I talked to commercial director, Ken Sewell, who formed the company with his partner Paul Mardon. On the subject of quality assurance, he pointed out that it is not profitable to have equipment returned for repair; so they lay heavy stress on ensuring that once equipment has left Cambridge it never returns. The company evidently has a good measure of success with that, because only one man in the company looks after all the repairs, and it's only part of his work-load. With over 100,000 units out in the field, that is a testament to the reliability of Pulsar kit.

Pulsar is the most 'vertically integrated' of the four companies visited. That is, almost everything is actually made on the premises - including the circuit boards and metalwork. The resulting extra degree of control ensures good quality results.

Much of their metalwork and PCB manufacturing equipment is computer-controlled, which has two benefits. First, it makes for a more accurate job. Holes can be drilled and punched very accurately - much more so than would be possible doing it by hand. Secondly, computer-control means that the machinery can follow a complete sequence of instructions without human intervention. For example, the computer-controlled punch can punch unlimited numbers of holes in stainless steel sheet at a rate of roughly three a second, using up to 15 different tools, totally automatically. That saves a lot of work - which reduces the cost to the customer while increasing the quality of the product. Pulsar's computer-controlled drills produce similar benefits in the manufacture of their PCBs.

Once the PCBs are made and the components are inserted in the correct places, they need soldering. That is done on a whole board at once using a flow solder machine. This machine has a bath of molten solder with a wave in it about 5mm high, made by pumping solder up through a channel into the bath. The boards are passed over the top



Pulsar's factory at Henley Road, Cambridge.



Printed circuit boards flowing through the infra-red dryer. Panels are also printed in this department.



Computerised punching in the Pulsar factory - up to 15 different tools can punch three holes a second in stainless steel sheet.



Ken Sewell: "Application of computers to organisation is probably more important than their application in actual production."

of it and wherever metal on the board touches the wave it comes away soldered.

Pulsar boards are often double-sided - with switches, for example, on the reverse side. Those are manually fixed after the board has been through the solder bath. Then comes the testing of each board, their interconnection and further testing.

Meanwhile, the metalworking shop cut out the box from metal sheet, bend it to the required shape, do the necessary welding, insert any extra items (like bolts), spray-paint the whole thing and do the printing on the front. All that is needed is to marry the electronics and the case, give the whole thing a final test and pack it for shipment.

As with the other companies visited, the production and stock control is automatically controlled by computer. Production is planned for up to 15 weeks in advance, and the ordering of supplies is based on that production schedule. An interesting feature of this system is that it keeps statistical information on buying patterns to help with forecasting the likely demand for various products. That helps to optimise the production schedules and keep stocks down.

"The key is the production scheduling and the way it reacts to orders as they come in,"



The test area at Pulsar, Cambridge.



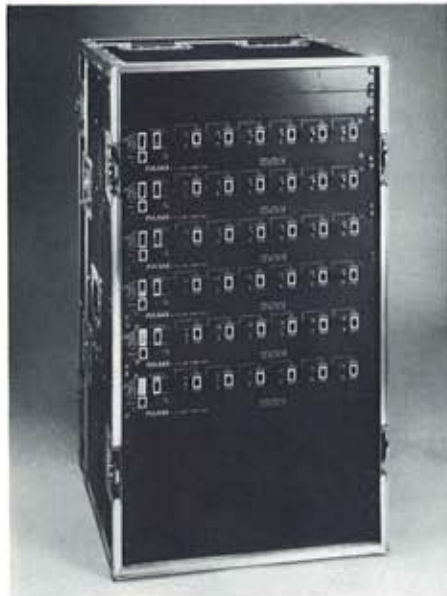
John Whittaker (above) keeps a close eye on everything that happens across the wide expanses of Pulsar's production areas.



Two computer controlled PCB drilling machines in operation at Pulsar.



Flow soldering in action.



Professional touring - the Portapak 3 flight-cased dimmer system from Pulsar.



Detailed product testing was a high priority for all four companies interviewed.



Zero 88's Peter Brooks demonstrates the Vacuclamp. It shrink wraps printed circuit boards in order to keep the components in place so that excess wire can be removed prior to flow soldering.



Zero 88's latest - a flow soldering machine in the company's colours.

said Ken Sewell. "Even with a very full order book orders will only be two weeks away at most. It's not 100% foolproof, but it is very good.

"It also means we carry lower stock in relation to turnover. We currently hold the same level of stock we held eight years ago, when turnover was 40% of what it is now. And bear in mind we've improved on delivery dates and we have many more products. In 1979 we had some six month delivery dates - now most items can be delivered from stock. Nothing sits around, but on the other hand we are not held up for anything."

Lastly, I asked Ken Sewell how long it took to get an idea from the back of an envelope into production. The answer quite took me aback - anything from one to three years! This was until recently the main bottleneck in the company. Now, however, due to investing something in the region of £70,000 in CAD equipment, that bottleneck has been considerably reduced, and this should increase the flow of new products from Pulsar.



Citronic's Tony Akers - in the middle of a new £70,000 company-wide networked computerisation scheme.

Citronic Limited

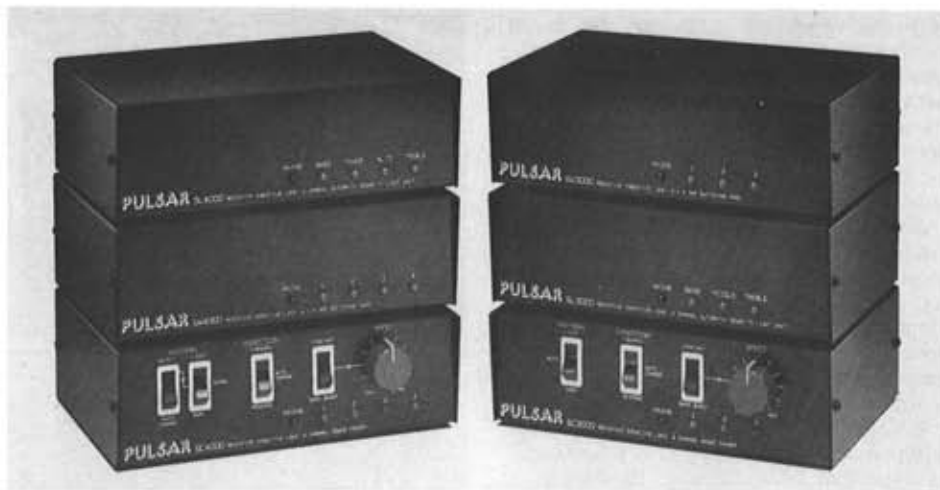
Among Citronic's products are disco consoles, mixers and amplifiers, and with a turnover of over £2 million, a third of its products are exported.

As part of a policy of concentrating on what it does best, the company sticks as closely as possible to designing and producing electronics. The naked PCBs are produced outside, but making the boxes is an in-house activity. They cut, bend and weld the frames and boxes for their equipment, but the painting and anodising is sub-contracted.

The printing on the front panels also used to be contracted out in the early days. Unfortunately, the work wasn't always of the required quality. For example, if the ink used is mixed wrongly it might look fine to begin with but wear off over six months or so. After having that happen, it was decided to bring the printing in-house, where the company's devotion to quality could be brought to bear on the job. Now all Citronic's front panel printing is done in-house.

Citronic also use a CAD system to help with the design stage, but even then it can take anything up to 18 months to take something from idea stage to getting it rolling off the production line. The PPX900, their popular sound amplifier, took 18 months to develop.

The actual manufacture of electronic circuits is very similar in most factories. The component leads are inserted into holes made ready for them in the circuit boards, they are soldered by hand or in a flow solder machine, and then tested. But populating the boards with the electronic components is a very labour-intensive process. To speed this up (and keep costs down), Citronic use several semi-automatic insertion machines. These are programmed with information on



The new Pulsar 'S' range comprises six controllers for the mobile and small installation market.

where the components are to be placed in the circuit board; the operator sits at the machine with the board in front of her and all the necessary components within easy reach.

In operation, the machine shines a light on to the appropriate spot on the board where the next component is to go. The operator inserts it, and the light moves on to the next spot. By giving the operator help in this way, the time she would normally take to look for the correct place on the board is almost eliminated. The job is thereby made much more efficient, and the cost of inserting the components is brought down. Once all the components are in, the component leads poking through the board are cut by the machine to a standard length and the board is then ready for sending to the flow solder machine.

Once the boards are completed, it is time to test them. Computers help here as well, by partially automating the job. Every board must be tested, so anything that helps speed up the process or make it more reliable is a worthwhile thing. This constant attention to quality and efficiency is helping Citronic gain a secure foothold in the pro-sound market.

Citronic have always used computers, and are currently in the middle of getting a new £70,000 13 terminal network system up and running, and staff are busy learning new procedures. As managing director Tony Akers explained: "You are expecting people to still get on with the job, (Citronic's staff totals 70 people), but they've also got a whole new way of thinking to learn. It's managing **that** that is the main problem. Otherwise computerisation is easy!

"All production is based on careful sales forecasts," said Tony Akers, "and sales director Mike Gerrish runs a very detailed sales forecasting program every month which takes into account four year's sales. Our new system will be able to tell us about problem areas much faster, and management decisions can obviously be made quickly too, as

a result. Our next project is to link our CAD system to manufacturing for quality assurance - they use the same basic data.

"Everything we are doing obviously involves a level of commitment, and shows a degree of confidence in the industry, and I'm sure this applies to many other PLASA companies," he said.



Extensive testing (above and below) at Citronic's factory at Melksham in Wiltshire.



Getting down to fine detail - part of the manufacturing area at Citronic.



Setting up for a run on Citronic's CNC punch machine.

and Finally . . .

Three important ingredients for success stand out from these brief views. They are: good design, high product quality, and efficiency in production. Good design makes a product marketable; attention to quality makes for a reliable product and a good reputation; and production efficiency keeps the price down to fend off the competition.

And good design is absolutely essential; nobody will buy a poor product, however cheap it is. It also makes production easier. Peter Brooks remarked on that, saying: "We try hard to design in such a way that it is very easy to install one of our products, and also very easy to service. We are trying to design products that are quick and easy to install, and quick and easy to make."

It's also evident from my visits that while investing in production technology (like computer-controlled punches) is important, the primary way of ensuring production efficiency is the use of computers to organise the factory properly. Ken Sewell agreed, commenting that: "Application of computers to **organisation** is probably more important than their application in actual production."

It is encouraging to see these factors being successfully put into action by PLASA companies. That they are doing so is demonstrated by the way they have grown from a cottage industry to the level of other companies in the electronics industry in the space of only a few years. "What is different about our industry is that we are expected to provide **exactly** what the customer wants at the drop of a hat, and we have become expert at quality small-batch production," said Tony Akers. "And we are successful in doing just that."

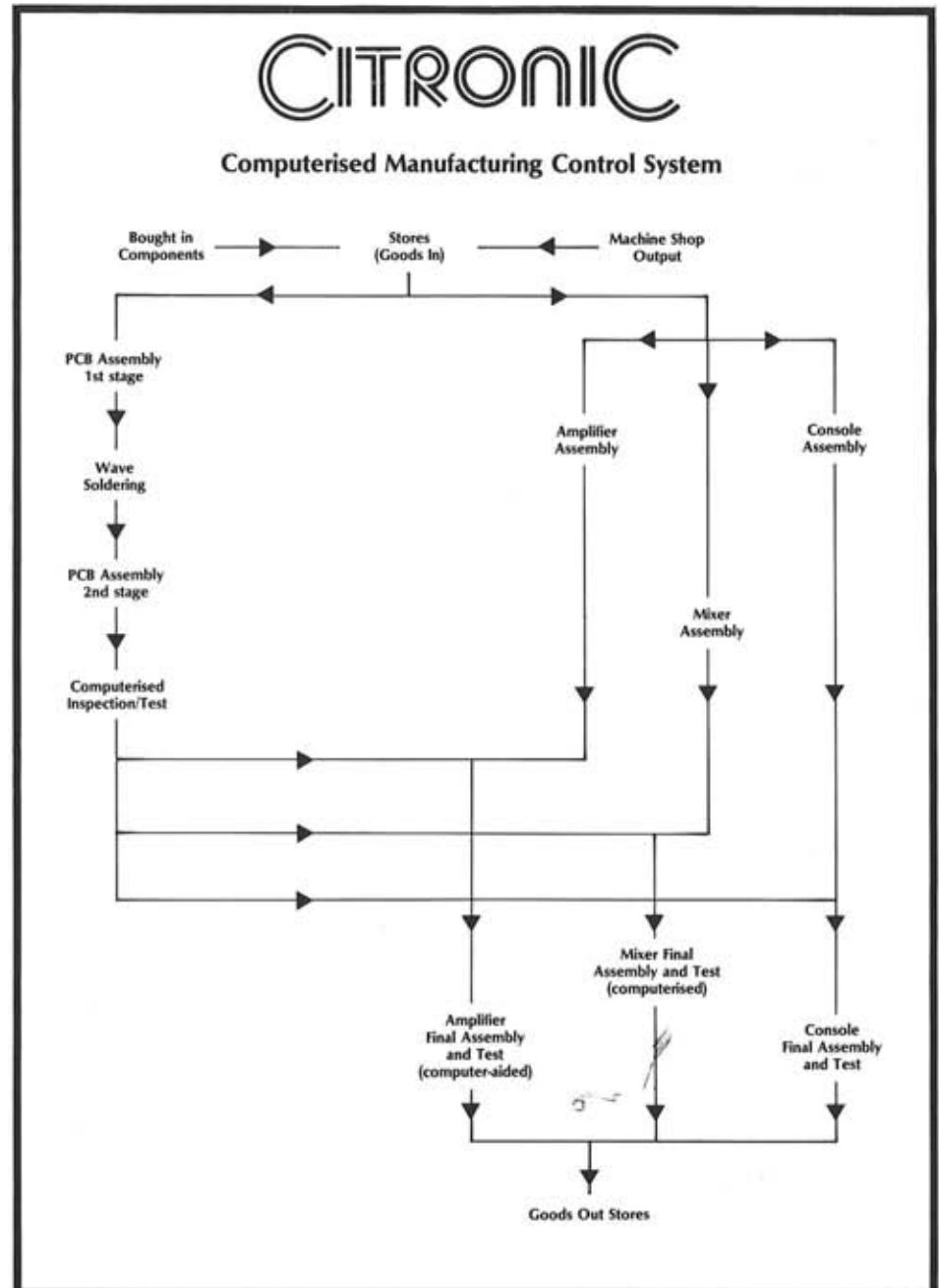
The manufacturing side of our industry certainly deserves its high reputation both at home and abroad. As N.J.D.'s Kevin Hopcroft said: "We are really serious about it, and we are doing things properly."



One of the most technically advanced consoles on the market - Citronic's Thames II (above). Below, the PPX range of power amplifiers.



Citronic's semi-automatic PCB assembly line.



AT THE TOWER THISTLE HOTEL IT'S THE SOUND THAT STANDS OUT, NOT THE SPEAKERS.

At the exclusive Tower Thistle Hotel, a stone's throw from Tower Bridge, the guests are used to the best. So the management felt obliged to choose the outstanding Bose 102 loudspeakers for the hotel sound system.

Bose 102s give you true, high fidelity sound, even in noisy environments.

Their System Controller offers you a choice of high fidelity stereo or two separate music channels, so you can play different types of music in different rooms.

Not only that, but their Opti-Voice paging system ensures voices are heard clearly and evenly.

And as the Bose 102s project sound to a wider area than conventional speakers, you need fewer of them. Which makes them quicker and easier to install.

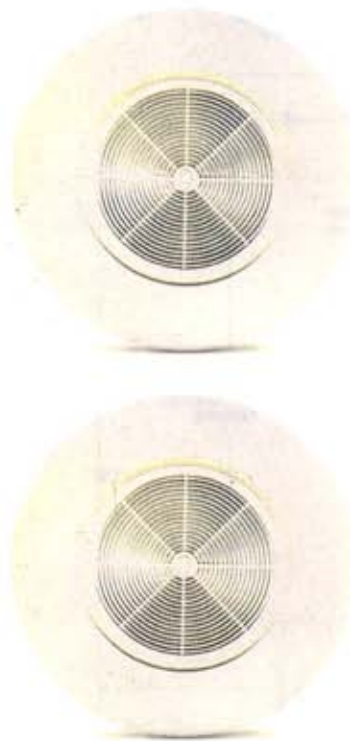
But let's not forget another important point about the 102s.

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Newcastle Theatre Royal

John Offord takes a look at the newly resurrected Theatre Royal after its £9 million-plus re-build.

The Theatre Royal, Newcastle, one of the finest theatres in the country, re-opened on 11th January after a £9,000,000 restoration and refurbishment programme.

The principal touring theatre in the North East, the Theatre Royal has played host regularly to major companies including Scottish Opera and Ballet, and from 1976 it has been the base of the Royal Shakespeare Company's annual tour to the North East. However, poor facilities both front-of-house and backstage threatened these tours, and in June 1986 the theatre closed ready for major restoration to commence.

Built on the present Grey Street site in 1837, the interior of this magnificent portico theatre was destroyed by fire in the late nineteenth century. Re-designed by the famous theatre architect Frank Matcham in 1901, it was to his designs that architects RHWL turned in their restoration work.

Major improvements carried out include the reorganisation of the foyer to overcome the segregation of audiences and to give easy access to all levels of the theatre, coupled with a substantial increase of the bar

areas. Restoration and refurbishment of the auditorium and foyers has been carried out in the original Matcham colour scheme. The stage has been enlarged to improve get-in and storage facilities for major productions, and dressing rooms have been re-built to accommodate over 100 artists. A new multi-purpose space has been constructed for rehearsals, warm-ups, small scale performances, and functions. To complete the project, the honey-coloured exterior stonework has been restored and cleaned.

The elegant Matcham interior has been faithfully restored by interior designer, Clare Ferraby. Working from original drawings and from paint scrapings taken from the plasterwork, the dark greens, reds, pale greens, pinks and the gilt which once highlighted the detailed plasterwork, on the tier fronts, ceiling and surrounding the proscenium arch have all been carefully matched.

The Theatre Royal was bought by Newcastle City Council in 1972 and the refurbishments have been financed by the City Council in a matching maximum possible grant from the EEC's Regional Development

Fund of £3,422,043; the Arts Council in one of their last housing grants, gave £500,000; English Heritage contributed £250,000; the English Tourist Board £178,000 and before it was abolished, Tyne and Wear County Council contributed £500,000.

I visited the Theatre shortly after its re-opening in the company of Jonathan Allen of Northern Light, a Scottish company with Edinburgh and Glasgow bases who make regular incursions southwards across the border to scoop up major theatre contracts in England. "It's been one of our biggest projects, and I'm pleased the theatre and the technical staff have got what they want," said Jonathan Allen. "From the technical point of view it is good to have worked alongside architects who demand such a high level of finish and standards from all the contractors involved."

Much of the technical equipment supplied has been organised to suit the very wide operational demands of the Royal Shakespeare Company, and Jonathan Allen paid tribute to Simon Boudler of the RSC. "His notes, conceptual ideas, and general



The auditorium of the newly refurbished Theatre Royal pictured from the stage. Standard lighting equipment consists of Strand Harmonys and Cadenzas.



The restored auditorium, Newcastle Theatre Royal. Three Meyer 500 loudspeakers are usually positioned either side of the proscenium arch. When not required, as in the picture above, brackets are also removed leaving only a small fixing stud.



Nicholas Thompson, partner in charge for the RHWL Partnership, with interior consultant Clare Ferraby.

design comments on lighting were passed on to us," he explained. As for sound and communications, Northern Light can justly claim credit for these areas, being specialists of high repute in this field.

They acted as consultants to the Theatre Royal on the supply and installation of sound and communications equipment, and they also acted as advisers with regard to the installation of the lighting control system and supplied the following equipment: socket boxes, working light control system, under fly floor ladders complete with tracks, perch towers and FOH gallery support brackets. Installation of the lighting was undertaken by Strand Lighting.

Locally-based Canford Audio of Washington installed all sound and communications equipment, with Dave Procter in charge as project manager. Hugh Morgan-Williams, a director of the company, told L+S: "We were delighted to have been involved with one of the biggest theatre projects for some time - possibly the theatre project of the eighties."

The Technical Set-Up

Lighting

The lighting control system is a Galaxy 2 Premier with two theatre playback panels, a programmable effects panel and the standard group masters, pre-set masters and channel control panels. There is a designer's remote control facility with five infra-red pick up points, two in the auditorium at gallery level, two on the rear of the proscenium arch at fly floor level, and one in the prompt corner allowing for a portable receiver downstage centre or as required.

There are a total of 325 dimmers - 29 x 20A and 296 x 10A - which include the Theatre's original STM dimmers which were re-used to reduce the overall expenditure. There are also 48 independent circuits controlled through the Galaxy.

Circuit distribution allows for 100 circuits FOH, 123 circuits at fly floor level and 72 spread between stage level, perches and the orchestra pit. 16 of the FOH circuits are available on the prompt side fly floor along with a further 30 which are available for use on both the prompt side fly floor and FOH which are specifically there to feed equipment on the temporary FOH bridge which is frequently installed by the RSC. The RSC also frequently add a forestage, and permanent FOH positions have to allow for lanterns rigged at a steeper angle. Both the grand and upper circle front lighting positions are removable and the only permanent positions are the gallery front and



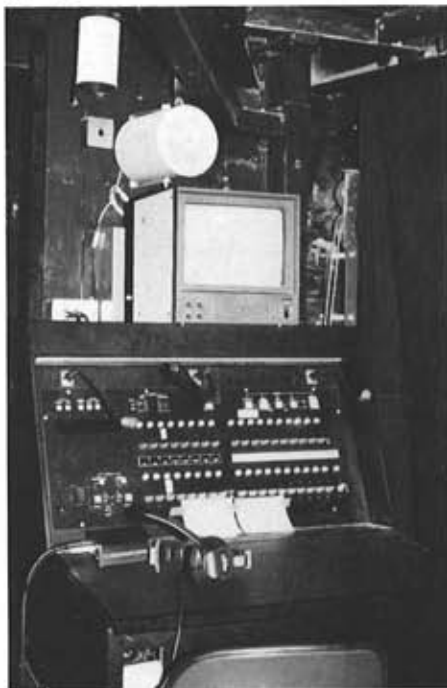
Lighting bars fixed to tier fronts are easily removable - the auditorium can be returned to a totally 'clean' state with a minimum of fuss.



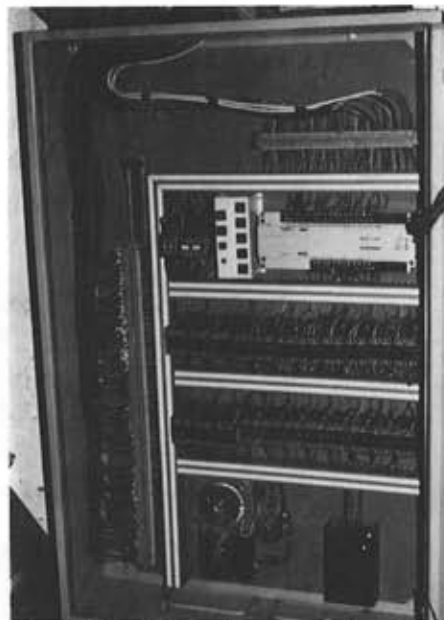
The elegant Matcham interior has been faithfully restored by interior designer Clare Ferraby, who worked from original drawings and paint scrapings.
Colour photography: Martin Charles



Andy Kent, the Theatre Royal's chief electrician, pictured with Northern Light's Jonathan Allen in the FOH lighting control room. The board is a Strand Galaxy 2 Premier.



The specially designed stage manager's desk.



The working light contactor rack. The system gives stage management total control over all lighting over the stage area during a performance or fit-up.



Jonathan Allen at the DDA 32 channel mixer in the FOH control room.

ceiling. To provide an adaptable front gallery lighting position the old front row of seats has been removed and a double support bar installed on the back of the gallery front along its entire length. Lanterns can be rigged in any position by adding a support tube or a 90° overhang bracket as necessary.

Backstage alloy ladders are suspended on tracks on the underside of either fly floor. The tracks follow the rake of the stage/fly floor and are fitted with a brake which can be released by the rigger or from stage level. When the ladders are not required they can be parked behind each other, adjacent to the proscenium arch. On either perch a vertical Minibeam truss tower provides an ideal rigging position which can be climbed, saving the use of a Tallescope for setting and focussing in this awkward position.

In the prompt corner there is a working lighting control panel which has been designed to give the SM complete control over both performance and fit up lighting. The system has been designed around a programme controller which provides the logic control for the output contactors from the out-stations around the stage areas and the SM control panel. The SM panel allows for individual circuit control for each circuit around the stage selected under either of two modes 'Fit Up' or 'Performance' (Blues) state. The local pushbutton can switch either the Blues/Fit Up lighting off/on in each area but only within the overall state selected by the SM.

A Fit Up state can be selected on some designated circuits which will override the performance state to allow for scene changes etc., but this can only be selected from the SM panel. On final exit the system is turned 'Off' at the SM panel which automatically turns on the prompt side Fit Up circuit allowing for an illuminated Exit of the stage area. In this off mode the prompt side local control is enabled for on/off control with all other access to the system barred. Selection of the Fit Up state on the SM panel will return all circuits to their last used state in that mode. The control panel also houses two take control faders allowing for control of orchestra pit and house light dimmers. This facility is duplicated in a blank panel on the Galaxy.

Audio and Video Facilities

Introduction

Backstage facilities include a stage manager's desk incorporating a cue light system, backstage and FOH paging from a number of locations and a show relay system. Video facilities have also been provided. A separate speech reinforcement system is installed in the FOH Function Room, and there is an induction loop facility for the hard of hearing.

As the theatre is primarily a touring venue, every effort was made to provide as many comprehensive facilities as the budget would allow. Some items from the original system which were compatible with the new facilities were incorporated, including Bose 402 and 802 loudspeakers, Yamaha power amplifiers, a Revox B77 tape deck and graphic equalisers.

The RSC carries a substantial amount of sound equipment including a Meyer UPA-1 loudspeaker system which they have successfully used at the Theatre Royal on many occasions in the past. In view of this, it was hoped that a UPA-1 system would be included as part of the installation, but unfortunately the costs were too great, and a Meyer 500 System has been installed instead.

Sound System

Mic, Line and Loudspeaker Circuits:

Connector panels located in the auditorium and backstage areas provide access to a total of 60 microphone and 44 loudspeaker circuits terminated on a jackfield/patchpanel located in the stage left Rack Room. From here, it is possible to patch any of the microphone circuits to any of 32 dedicated circuits associated with the microphone input channels on the mixer located in the FOH Control Room.

Some of 32 tie lines link the various connector panels to a patch panel in the FOH Control Room. A further 20 dedicated tie lines run between the Rack Room and FOH Control Room.

Rack Room Equipment:

Three racks accommodate the equipment

associated with the distribution facilities. The first rack houses the microphone jackfield and loudspeaker patchpanel. The jackfield utilises 316 patchcords whilst the loudspeaker patchpanel uses Neutrik connectors for inter-plugging.

The loudspeaker patchpanel enables any power amplifier output to be connected to any loudspeaker with the exception of the Meyer amplifiers and loudspeakers. These circuits have been wired so that they cannot be inter-plugged with other amplifier/loudspeaker circuits. Equalisers associated with the Bose 402 and 802 loudspeakers are installed in the Rack Room along with two eight-way distribution amplifiers. Provision has been made for digital delay units and limiters to be installed in the future if required.

A second rack accommodates the five Meyer power amplifiers which are dedicated to the Meyer 500 Series loudspeakers. A further six HH VX series amplifiers are available for stage effects and foldback purposes. The third rack houses two Yamaha amplifiers along with the induction loop facility for the hard of hearing. Patching facilities enable the loop to be driven from different sources, i.e. show relay output, mixer output, etc.

Control Room Equipment:

A DDA 32 channel mixer frame is installed in the FOH Control Room. It is fitted with 27 channels and an adjacent jackfield located in a purpose-built shallow rack provides access to line inputs and outputs, channel and group inserts, auxiliary and foldback sends, returns etc. Along with housing two eight-way distribution amplifiers, the rack contains a further jackfield for the inputs and outputs of ancillary Control Room equipment.

An EMO controller located in the Control Room equipment rack enables the mains to be switched in a pre-arranged sequence to both the Rack Room and Control Room equipment racks. The rack also accommodates ancillary equipment which includes two Luxman cassette decks, a Luxman CD player, two Yamaha SPX 90 effects units, two one-third octave graphic equalisers, a Trident twin-channel compressor/limiter, Quad 520 power amplifier and the mixer power supply. An RIAA pre-amplifier is also installed in the rack.

A mobile trolley accommodates two Revox B77 tape decks which enables them to be positioned adjacent to the operator for ease of access. The mounting arrangement allows the operating angle of the decks to be adjusted.

Control Room monitoring is provided by a pair of KEF R103 loudspeakers mounted from a track which allows them to be positioned anywhere along the length of the console. When not required, they can slide aside to afford the operator a better sightline to the stage.

Loudspeakers:

Loudspeaker coverage of the auditorium is provided by the Meyer 500 system, and the Meyer power amplifiers are dedicated to these circuits. In addition to the pair of loudspeakers associated with each of the four auditorium levels, an additional pair are used for side-fill in the stalls level. The rear of the Gallery is covered by a pair of Bose 402 units.

JBL wedge monitors are used for foldback and JBL units are also used for stage effects loudspeakers, all being powered by HH VX series amplifiers.

Stage Manager's Desk:

The desk is located on stage left and contains the usual facilities - digital clock switchable to real-time or stop-watch mode, a dimmer-controlled blue and white lighting circuit for the control panel and script area, paging microphone for both the FOH and backstage paging facility along with the associated zone control switches. The desk also incorporates a twin channel ring intercom facility.

The desk and its facilities are connected to the permanently installed cabling by means of multi-way connectors. A second connection position is provided to enable the desk to be operated from stage right.

Cue Light System:

Controls for a sixteen-way cue light system are incorporated within the desk. Of the 16 circuits, eight are dedicated to the most used out-stations,



Another view of the sound control room.

i.e. Sound, Elex, Downstage, Upstage PS and OP, Flys, Pit etc. The remaining eight circuits are terminated on a patchpanel in the Rack Room and can be patched to any of two out-stations, these being located on the various connector panels in the stage and backstage areas.

Ring Intercom System:

A Technical Projects ring intercom system is installed with the power supply unit located in the Rack Room. Access to the system is available from 64 locations. The out-station incorporated within the Stage Manager's desk is a twin channel unit. The belt-packs associated with the system are single channel units but are switchable to either channel. Single and dual headsets are available for use with the belt-packs.

Show Relay:

On the front of the dress circle, two rifle microphones are installed which are associated with the show relay system. The associated amplifiers are located in a fourth rack in the Rack Room. The microphones also provide an input signal to the Induction Loop facility. A switch on the SM desk enables the show relay to be switched off during fit-ups, etc.

Show Relay loudspeakers are installed in Crew Rooms, Dressing Rooms, Corridors, Toilets, Green Room etc. Local stepped volume controls with a graduated scale are fitted to each loudspeaker.

Backstage/FOH Paging:

The main paging position is the SM desk, where a gooseneck-mounted microphone is installed along with zone selection. In addition to the controls for the individual zones, a master is also available to enable all zones to be accessed



Lighting connection points are hidden within the top cushion of the tier fronts. Jonathan Allen reveals the secret hiding places.

simultaneously.

Additional paging positions have been provided Downstage PS, Stage Door, Rehearsal Room, Sound and Elex Control Rooms. The associated amplifiers are located in the Rack Room. The SM desk and Downstage PS microphones have access to Stage, Backstage, Crew Rooms and FOH areas. The Rehearsal Room and Stage Door microphones have access to Backstage and Crew Rooms. The Control Room microphones have access to Stage and Crew Rooms.

The loudspeakers associated with the Show Relay system are also used for the paging facility and are connected such that the local volume control does not permit adjustment of the paging reproduction level.

At the FOH Kiosk, a separate Paging position has been provided with the associated power amplifier located in an adjacent store. Paging loudspeakers are installed in the FOH Bars, Staircases and Toilets, along with the Salon and Function Room. In addition to the local paging microphone, the SM desk also has access to the FOH system. Indicators at both locations show when the facility is in use. Facilities have also been provided to enable tape decks to be connected for background music, pre-recorded promotional material etc.



The fly gallery - ring intercom access points are available at no less than 64 different locations. Two can be seen in this picture.

Function Room:

A separate speech reinforcement system has been installed in the Function Room. Wall mounted panels each with two microphones and two line level circuits are connected to an amplifier located in the room. Ceiling-mounted loudspeakers provide coverage of the room, and are zoned to permit microphones to be used in a number of positions without the risk of feedback.

Although the SM and FOH paging positions have access to the Function Room loudspeakers, a local switch enables the paging input to be muted whilst the system within the room is being used.

Video System:

Comprehensive cabling has been installed to enable video and associated audio signals to be sent to and from a number of backstage and FOH areas. In the Rack Room, these circuits are terminated on a patchpanel. A colour camera is mounted on the front of the dress circle and directed at the stage. A monochrome camera is located in the pit and directed at the conductor. The outputs of both cameras are available on the patchpanel. By means of video and audio distribution amplifiers located in the Rack Room, the outputs from the cameras and the associated audio can be routed to the required destinations backstage and FOH.

Colour monitors are available for latecomers in FOH areas with monochrome monitors being used for the backstage facilities. Provision has been made for video cassette recorders, a caption generator and an off-air TV tuner to be connected to the system.

Theatre Royal, Newcastle upon Tyne

Architects: Renton Howard Wood Levin Partnership (partner: Nicholas Thompson)
 Building Engineers: Ove Arup & Partners
 Contractors: Bovis Construction Limited
 Consultants on the supply and installation of sound and communications equipment and advisers for lighting control system: Northern Light
 Electrical Contractors: Crown House Engineering
 Lighting control and lanterns: Strand Lighting
 Sound and communications installation: Canford Audio
 Socket boxes, rigging equipment and working light control system: Northern Light

Classical Gas

Graham Walne takes a look at the Royal Opera House's communications system.

I don't wish to sound as though I'm 90 years old, but after a fair number of years in this business, it's a rare product that excites. So I am indebted to this publication and to the Royal Opera House for providing me with a fascinating afternoon, in looking over their sound and communications under the guidance of Eric Pressley and John Charlton.

On the whole managements are reluctant to spend money on communications since they can neither be shown off to the ratepayers nor be considered box office attractions. However, it's a wise management that does make such an investment since quite obviously better communications produce a smoother rehearsal, and perhaps even pay for themselves, and in this respect the Royal Opera House is no different from the Pier Theatre at Clacton.

What is different about the Opera House is that its needs are somewhat more complex than Clacton's and I should first explain that the Opera House's weekly schedule usually involves mounting at least one new production (albeit a revival that hasn't been in the repertoire for several years) together with daily changeovers, rehearsals and perfor-

mances of other productions. And the needs of changeover and show running are slightly different from each other and so several systems are installed side by side.

What impressed me the most was the fact that all the systems have been designed and built in-house. Firstly this ensures that the theatre's special needs are supplied but it also guarantees considerable value for money if comparisons are made with commercially available products.

The stage manager still controls the shows using the well proven format of red-standby and green-go cue lights. However, opera tends to utilise more individual stage management cueing chorus and musicians in the wings where they work entirely from the score, whereas ballet can operate from one location. The new installation covers 48 circuits of cue lights around the theatre and if that sounds a lot, consider that some productions require five separate circuits on the mezzanine floor under the stage and six on each side of the main stage. Add to that the operation of follow spots and projectors etc. on the overhead and side bridges and the number easily mounts up. The locations were carefully examined to see if a perma-

nent or portable out-station would be best, and many at high level, for example, are permanent, simply to make changeovers easier and establish some positions around the building where people always know there is a light.

The design of the out-station was crucial since the old system utilised 15 watt pigmy lamps which were large enough to be seen from quite a distance - important when 150 people are waiting to enter! Another problem was that some locations needed several out-stations on one circuit, creating a loading imbalance. Furthermore, the needs of the productions themselves required a flexible system. Eric and John chose an LED based out-station which uses a module of 5 x 5 LED's. Any failure only affects one row so that at least 4 x 5 would still be alight. The boxes are all standard and capacious so that two more 5 x 5 LED modules can be inserted for large displays. The front face of the box which forms the diffuser also incorporates a small clear panel so that all internal connections can be viewed without dismantling. The control rack houses one card per way and each card can operate as a slave or as a master to other slaves when load sharing,



Royal Opera House sound engineer John Charlton pictured at the main mixing desk located in the O.P. side of the auditorium, almost directly opposite the Royal Box and against the proscenium wall at Grand Tier level. The Calrec mixer has forty inputs, forty outputs, and was installed just over a year ago.

Photo: Richard Holtum

the flies for example using 12 units. A useful master push illuminates all the LEDs for checking before the show.

It seemed to me a sensible marriage of new technology to an old technique. The Opera House has always traditionally used cue lights, except for the lighting control which is cued verbally, and again this is tradition. The modern head-set system is not used since it would easily become inoperable with so many mics close to orchestra and backstage foldback monitors. However the theatre needs verbal communication and has therefore designed its own system which is based on a 50 x 50 matrix where rings or radials can be built up as required. Some circuits can link 16 or 8 out-stations simultaneously, and these are usually used for lighting or the stage manager.

Out-stations tend to be loudspeaking with hand-set mic and the staff have done much research to ensure that there is a good coverage without feedback or intrusion into rehearsal. Again, perhaps some explanation is necessary as to how the Opera House functions. All lighting positions are permanently manned so that at any time in rehearsal the lighting designer or the person responsible for reproducing his design, can instantly do some focussing. Flies out-stations have open mics so that the fly floor can talk easily to the loading gallery, useful when 20 cloths need rehangng during a changeover. A nice feature is the provision of hand-set on the orchestra pit rail so that the person deading the show need not shout to the flies. Indeed, during the orchestra rehearsals it would not be wise to do so!

Closed circuit television is also installed, and there are three rings selectable at each

monitor. Usually one shows an overall view of the stage and another shows the conductor. The third ring is routed via a dimmer on the stage manager's desk so that all monitors which face the stage can be killed. Some productions can use 20 in this way and the combined spill would ruin a blackout.

People who have not been on a stage, or at least not upon a musical stage, are often incredulous that singers cannot hear themselves above the sound of the orchestra or cannot hear parts of the orchestra themselves. For this reason the Opera House uses an extensive system of foldback monitors which are fed from Bayer boundary mics on the pit rails, supplemented by Bayer rifles hidden by the proscenium, and by a Neuman hanging from the roof. The system also feeds the deaf loop and crush bar - so it has to be good!

All portable cue lights, video monitor, foldback and main loudspeakers can be plugged in around the building at special combined facilities panels, and for those who like to know about these things, the Opera House uses 5-pin Cannon for cuelights, 4-pin Cannon for 100 volt line foldback loudspeakers, and EP2's for other loudspeakers.

It might appear rather peculiar for a building housing ballet dancers and opera singers to have a sound department, but clearly Eric and his staff are involved in most shows if only for sound effects like thunder. Generally there is no microphone reinforcement on the shows although an occasional harpsichord or backstage orchestra might need some help.

There are, however, signs of change, Eric Pressley explained: "Modern opera isn't



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necessarily written for amplification but it tends to need it - it's a development of style." Consequently, the Opera House's sound installation is very impressive, centring around a Calrec 40/40 desk hidden in a box near the stage. The department have been experimenting for five years with their own loudspeaker designs. This arises from the need for supreme quality, "a counter-tenor still has to sound like Apollo", and the need to hide the units in the magnificent auditorium. Currently the system utilises about 20 Proacs in the auditorium with ElectroVoice on stage for effects.

It was very refreshing to talk to people in a major subsidised house who were concerned with both quality and cost. In conclusion I can only repeat my thanks for a highly interesting few hours!



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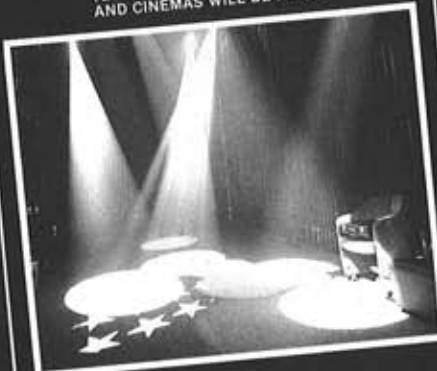
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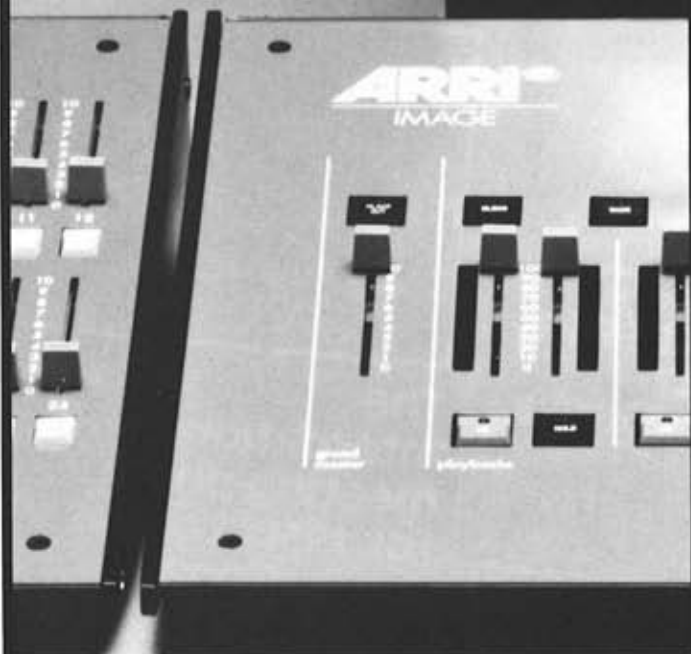
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Paul Farrah — Emphasising Sound

Roger St. Pierre reports on the fast-growing Paul Farrah Sound operation.

"Entertainment, generally, is far more about sound than vision. That applies in the theatre, certainly, and especially so in discotheques. If you turn all those fancy lights off then people will still dance - but if there's no music . . ." So muses Paul Farrah who, as head of one of Britain's foremost sound equipment hire companies, finds the over-emphasis on lighting effects rather than a good sound system to be a continuing puzzle.

"Special lighting effects can be stunning when you first see them, but people soon tire of them and start asking for something new. Spending money on a really good sound system pays far longer-lasting dividends."

Paul Farrah Sound, based in modern premises on St. George's Industrial Estate at Kingston-Upon-Thames in Surrey, was started eight years ago and has shown continual growth ever since. The company now employs 20 full-time staff and a whole host of freelance engineers.

Paul Farrah, 29, came originally from Darlington and ventured to London on leaving school in 1976. His background lies very much in the theatrical world: "I worked in the West End theatre business as a sound technician, then worked on tours of shows like 'Godspell' for Cameron Mackintosh," he told me.

"I had been having so many problems working with other people's gear on 'Godspell' that the idea formulated in my mind to put together my own equipment, so that I could have full control over my work. The first show I did with my own gear was Sondheim's 'Side By Side' in 1980."

Paul then took a small office in St. Martin's Court, in the heart of London's theatreland, and a store in Wandsworth. "Mark Bonner, who had been head flyman on 'My Fair Lady' at the Adelphi, joined me after I'd been in



Control set-up for the 1987 AGM of TSB at the Scottish Exhibition Centre in Glasgow. Paul Farrah will be working on this contract again in 1988.

business for a couple of years, and he's now our financial director.

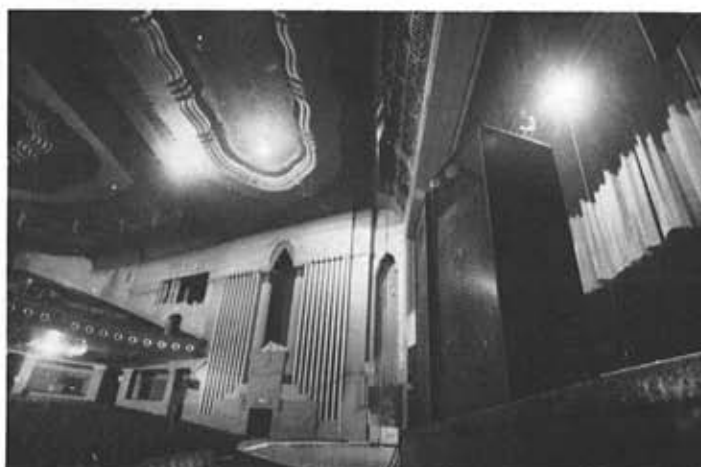
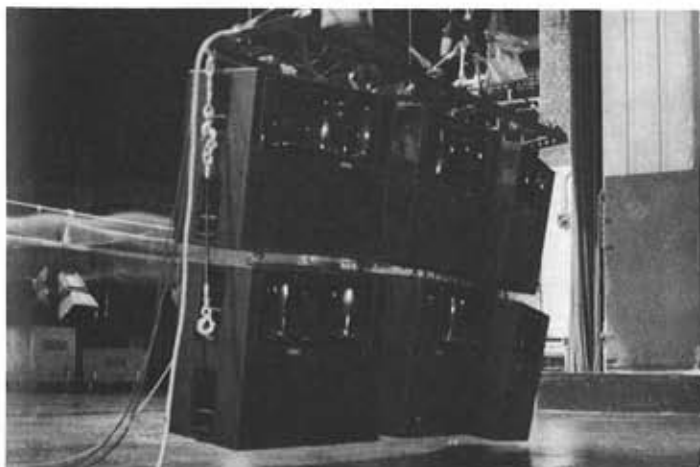
"Since those modest beginnings we have seen continual growth and we are looking at a £2 million-plus turnover this year. We've moved on into lots of areas other than theatre. Conventions and conferences are also a major area for us now.

"In recent times we've looked after sound for the annual general meetings of such major clients as Burtons, TSB, Virgin, British Airways, Westlands and Lonrho - and we are even providing the PA for the King's Cross disaster hearings. If you think of the top 20 members of the CBI then we probably count

at least ten of them among our clients.

"We've had some really challenging jobs. At the moment we are putting together a huge British Airport Authority 'experience' at Gatwick Airport, to celebrate the airport's 30th anniversary as part of the BAA. It is a multi-media project aimed at the staff of the Airport. It has become a major trend among big companies to put on shows which demonstrate to staff exactly what each division of the organisation does.

"This diversification into industry has been good for us as a company. Theatre productions are becoming increasingly ambitious, demanding ever more lavish sound systems,



Paul Farrah Sound for Ben Elton

Paul Farrah Sound recently provided a complete Nexo PA system for alternative comedian Ben Elton's five sell-out concerts at Hammersmith Odeon. It consisted of four Nexo MSIV, with two each side of the stage as shown above (right) and a flown cluster of six Nexo MSIC cabinets on a specially designed flying frame (left). All the cabinets required only a single loudspeaker cable and the whole rig was run from five stereo power amplifiers, but the total power output was a more than adequate 9kW. All this equipment was necessary to ensure that just one man and his microphone could be heard clearly anywhere in the venue.

and we felt there was a big danger of putting all our eggs into one basket and maybe getting badly hurt should there be a big turn-down in the fortunes of live theatre, or even a couple of disastrous shows."

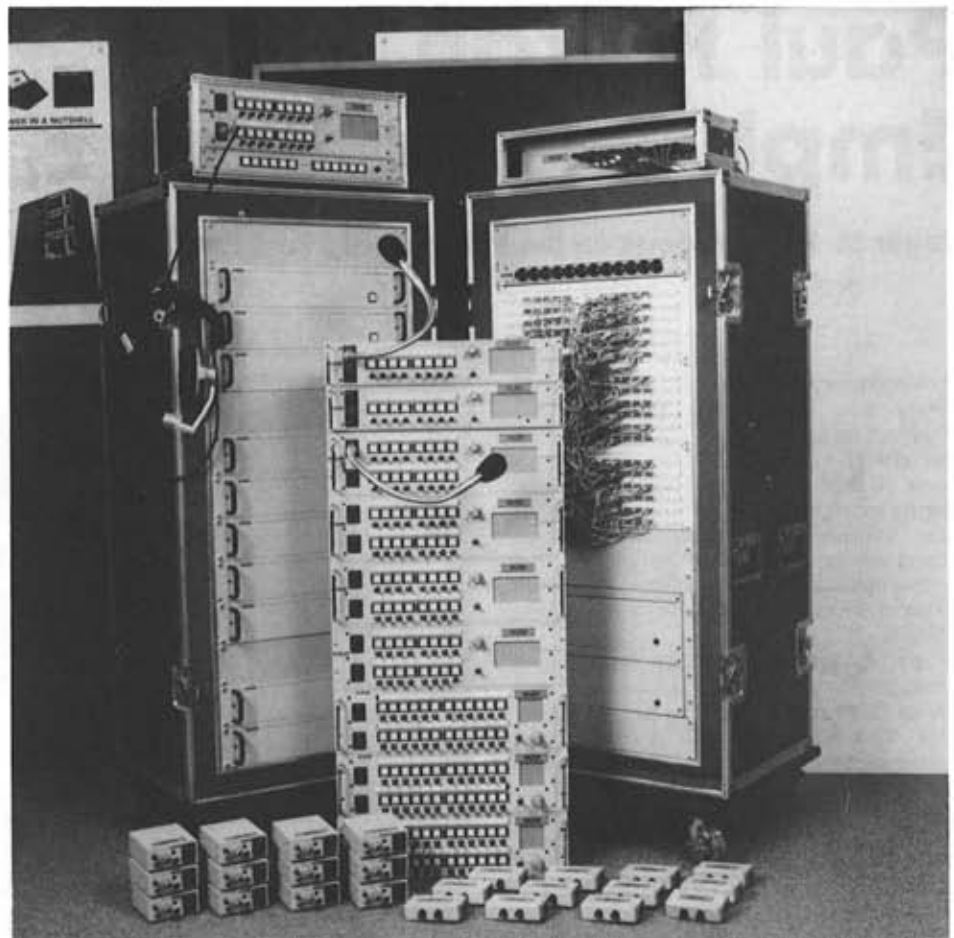
Backed by sales director Kevin Swain and fellow director Paul Keating, who looks after conference business along with Kevin, Paul has seen his business diversify into other areas too.

"Under our Metro Audio subsidiary we already manufacture communications and electronic test equipment and we are preparing a range of our own loudspeakers and mixers for the market," he said. "Our Minivox loud hailer is used by Butlins' Redcoats at Chessington World of Adventure, as well as by the police.

"Sales are now important to us, as well as hire. We are agents for Nexo, the industry standard for audio-visual presentation sound equipment, and we sell a lot of portable PA systems into the exhibition market. Anchor Audio is an important line for us, for example, and we sold more than 130 Soundcraft mixers since March last year - more than any other retail outlet in the world.

"We are also moving into the broadcasting field. We now boast the largest hireable broadcasting system in Europe, made for us by ROH, who equip every nuclear submarine in the US Navy. It is a multi-flexible system which will interface with cameras and so on. It is ideal for the coverage of major sports events and we will be offering it to US television companies covering events like Wimbledon - it will save them having to bring equipment across the Atlantic at heavy cost. The system represents a £100,000 investment for this company, but I'm sure it will prove to be a money-spinner."

It is a very busy time right now for the company: "We are working on a lot of plays at the moment. We are probably the biggest sound operator company in the country when it comes to touring shows. We are now even producing our own tours, like a production of 'Godspell' and a co-produced



Part of an £80,000 communications equipment package for the NBC coverage of the World Games in Italy in 1987.

tour of 'Charlie and the Chocolate Factory'. We also invest in a lot of shows - we have put money into 'Cats', even though we didn't do the sound for it!

"Currently we have around 50 freelance engineers out on the road operating our gear at ventures around the country," explained Paul Farrah. "We've also moved into providing PA systems for people like the police, local authorities and leisure organisations, for crowd control and so on. In the

future we would like to get into the club and restaurant installation business more heavily. We recently put a new sound system into the prestigious Coconut Grove restaurant in London.

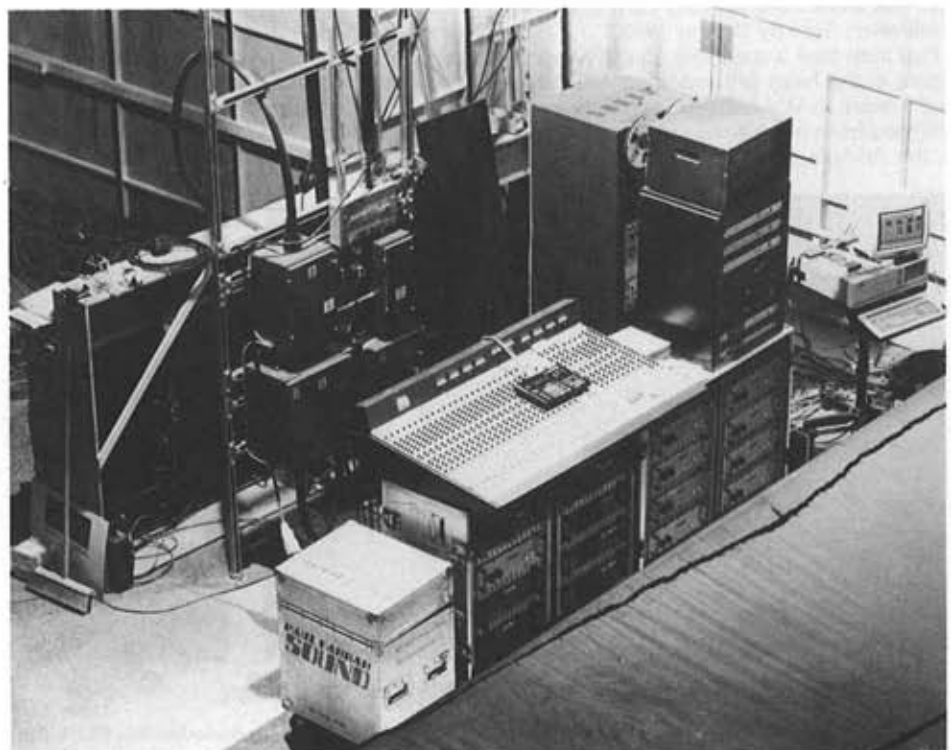
"The hire business has always been good to us, but we got into selling equipment because we would rather keep the business for ourselves than see it go to the opposition! We are, however, careful about the way in which we do that selling.



The new Metro Audio communications system will be launched at Sound 88 in February.



The Mini-Vox loud-hailer from Anchor. It was introduced in mid-1987 and is already proving highly popular for a wide variety of uses.



'The Gatwick Experience' - behind the scenes at the permanent exhibition at Gatwick Airport's new North Terminal.



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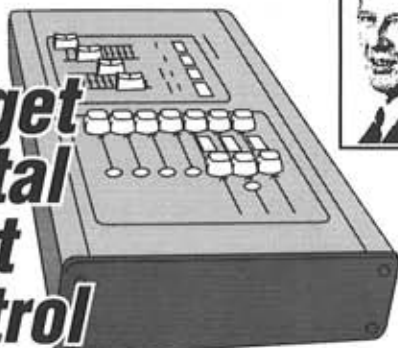
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"Most salesman will sell anything, but we hire people who will tell a client what we feel he really needs rather than just sell him what we have in stock. We are a professional audio company, and we look for the highest standard of professional integrity with our sales staff.

"We have a very strong team. Bruno Wayte joined us from Entec, Chris Gilbert was with Shure for years, and Trish Ashton built a good reputation for herself during her long stint with Hayden Laboratorys."

Paul Farrah Sound have more than £1¼ million tied up in hire stock, and everything is replaced on a rolling system so that none of the equipment is more than four years old. Sales stock accounts for another £150,000 investment at bought-in prices.

Paul himself believes demand in sound terms is becoming more sophisticated. "People do, however, still tend to confuse distortion with excitement. In general though, they appreciate a better sound quality today, thanks to the influence of quality home stereo and in-car entertainment."

A lot of the company's business carries their engineers abroad, and Paul says, tastes in sound change as you go round the globe. "West Indians love lots of bass, but as you travel further and further East the bottom end becomes less and less important.



Since March 1987 Paul Farrah have sold no less than 130 Soundcraft mixers - the majority being the 200B Series as shown above.

"Sound is still a very complex matter. Michael Jackson's 'Bad' album, for instance, sounds pretty terrible on CD because it was set up to be played on cheap stereos."

In parting, Paul reiterated his belief that sound is, and always will be, more important than the visual side of things. "After all, people buy the cast album of a show, not the cast photograph," he quipped.

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ON TOUR

Keith Dale

15 Years On Tour - Chameleon Lighting

Chameleon: Any lizard of the family *Chamaeleontidae* of Africa and Madagascar, having long slender legs, a prehensile tail and tongue, and the ability to change colour. Also, renowned lighting company based in West London.

This year is Chameleon's 15th birthday, and to celebrate the event Catriona Forcer and I went over to the West London base of the company to meet its directors. What we found was an abundance of talent, honesty and good humour combined with the latest lighting equipment from Thomas, Avolites and Celco, and their own brand of sophisticated dimming equipment.

What was soon to become apparent was that Chameleon have worked their way to the top by always demanding the best from their designs, their equipment and themselves. I discussed developments with Colin Jones.

When, where and why did Chameleon Lighting start?

I suppose it started full time in 1973 although we, that's Pete Barnes, George McDuff and myself decided to start a year earlier while at secondary school in Brighton. We had all been going to the same pop shows and doing discotheques etcetera together and one day we decided that we would start a lighting hire company for reasons that are still rather obscure!

We had decided that we didn't want to go on into further education and so, as we very much liked the music business in one way or another, like going to concerts, decided that we wanted to be involved with that world even more. So we sort of 'involved' ourselves. We left school and took a variety of jobs, saved money, built little lighting rigs, ran discos, and eventually in late 1973 we got something that we considered 'work'. It was then that we really became self sufficient, so that's why we're saying 1988 is our fifteenth year.

So, in 1973 you were able to earn enough to take care of yourselves?

Well, I say self sufficient, but if it wasn't for our parents being so good to us, letting us live at home and that sort of thing, then we wouldn't have been able to do it. Also, at that time, two wind-up stands with 16 spotlights was a fair-sized system and could easily have been used at Hammersmith Odeon. In fact, I think we did Hammersmith Odeon with two stands and 20 spotlights in 1975, but I can't see anyone being able to do that these days!

So what was the first job that you were able to call 'work'?

We got a residency at a club in Brighton called 'The Hungry Years'. We had to do many different jobs there, like being disc jockeys

and generally running the lighting and things like that. It was a cross between a light show and a disco with four live bands a week, for whom we would do the stage lighting. Yes, that was the first full time thing that earned us money and that ran on until 1974/75 when we got our first real tour with Alexis Korner. We also looked after Soft Machine, Budgie, and Sutherland Brothers and Quiver. Sutherland Brothers and Quiver were very helpful to us because they asked us for a truss and were prepared to pay enough advance on the tour for us to build one.

How did you make the initial contact with the bands?

We sent a letter round to all the management companies to see what response came back.

And you were in Brighton all that time?

Yes, we stayed in Brighton until 1977 when we began working out of the Power House in Acton, which was when things really started to change. In 1978 we became a limited company.

And when did you move to your present base?

In May 1985 - although it was in 1984 that we had to leave the Power House. In between then and moving here we were working out of two trailers, three lock-up garages and some space at John Henry's. It was most probably the most economical nine months of our lives with hardly any overheads! Spandau

Ballet were on the road for a while, and we were doing Big Country and King. All of that spanned the majority of this period, plus a few other bits and pieces as well. But it was very difficult to organise when you had gear strewn all over London!

Do you think that the Motorhead connection is something that you have become tagged with?

I hope not! Maybe it was once - when we were always doing Motorhead and Hawkwind. Nearly all our work was with heavy metal acts then - and mainly ghastly ones at that! I suppose Motorhead were the best of the bunch.

I think the Motorhead 'thing' has stayed in my mind because of The Bomber. That seemed quite unique to me.

Yes, I think it stayed in a lot of people's minds. It was interesting to see the response we had about resurrecting it for the show before Christmas.

Do you still have the original Bomber?

No! We're on mark three now!

What happened to the original Bomber?

It actually ended up on a Doctor Who set as a Cybernaut Drilling Rig! They had bits of trussing and the Bomber stuck in the usual sand pit and pretended that the Cybermen were drilling into the centre of the planet!

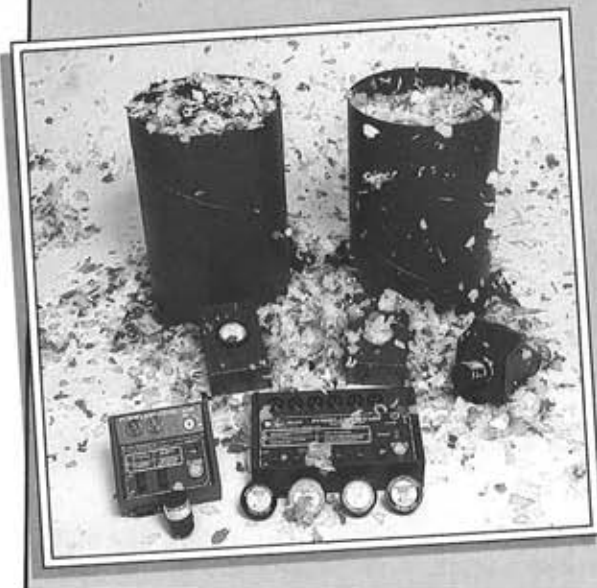
Was there any particular band that assisted your growth in the earlier days?

Well, Sutherland Brothers and Quiver were always helpful, but I suppose we were grateful of work from anyone really.

Nowadays you have become associated with more modern bands such as the Eurythmics. Has that been a conscientious effort?

No, it hasn't been particularly by design - it's just happened. It's not always good to get

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associated with certain things. We particularly tried to reject the heavy metal thing that we seemed to be stuck with and we were getting very fed up with the same old design of rigs going out. So I started doing Spandau, Pete started Big Country, and Siouxi and the Banshees started doing some interesting productions - and at that point we thought that this was a much nicer route. We had shaken off all the head bangers and started doing bands that you would listen to at home!

You mean what the music press call credible bands?

Yes, the kind of bands that the music press like whilst they're on the way up, but then take great pleasure in tearing down once they've got to the top. I'm glad though that we've now got such a cross section of bands - from Alison Moyet, Black, Eurythmics, Echo and the Bunnymen, Public Image and Siouxi and the Banshees and at the same time we're still doing Rory Gallagher, Motorhead and Hawkwind.



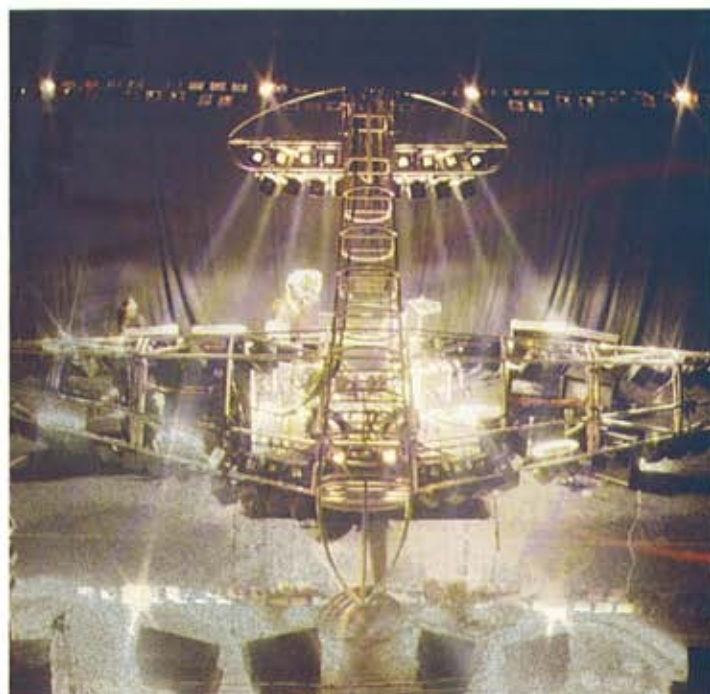
'The Cult' - a video shoot at Pinewood in January 1987.



Spandau Ballet 'World Parade' 1985.



The Cult on tour, 1987.



The famous Motorheads 'Bomber' - 1981/82.

Cliff Richard — 'Always Guaranteed'

Julian Williams joins the Cliff Richard tour before its departure to Australia and New Zealand.

For those who witnessed Cliff Richard's disappearance beneath the laser waves at the end of Ocean Deep in his celebratory concert 'Silver' in 1983, some may have wondered when this superstar might take his final curtain call.

A showbusiness singing phenomenon, and probably the longest-working rock star, Cliff Richard now emerges to celebrate his 30th year in the business with as much technical regalia as he can muster to support a show with a second act composed entirely of new songs. With a three-hour solo performance he takes on the world with this tour, and at this very moment, is touring Australia and New Zealand to join in with the bicentenary celebrations. This month also sees the launch of his new video which includes live sequences from the show.

He is planning to make a T.V. commitment in Israel as part of the 40th anniversary of Independence in April, politics permitting. However, even this dynamic superstar doesn't always manage to get to the places where others may not reach. Stuck halfway up a Norwegian mountain in a blizzard on the road to Oslo, even he had to cancel a booking on this tour.

Cliff and his entourage began the tour in early October 1987, and played in Switzerland, Sweden, Germany, Denmark, Finland, Austria and Belgium. He dropped in for a long-awaited return visit to Yugoslavia and Poland and, for the first time, to Hungary.

One foggy evening in December, I was amidst an audience of almost 12,000 assembled at the Birmingham NEC Arena stadium to conclude a week of similar 'sell out' performances, which closed this 56-date tour of Europe - all inside a 10-week period.

The subtle colouring of sweeping rose pink, swaying light green, and 'blinking' bright yellow multi-moving light beams helps to animate the pace, and harmonise with every move of the artiste. High above the stage is a 12 foot video screen, so even those at the back can see every move. A couple of sparkling mirrorballs and even a traditionally



Cliff Richard in performance during his 'Beyond Time' Gospel Tour. Photo: T. Wassif

theatrical Star Cloth help to complete the spectacle through occasional emblematic puffs of smoke.

When setting up a tour production, Cliff spends a lot of time with his technical people, putting over his own specific ideas from the design point of view, while demanding a high quality of presentation utilising all the very latest technical effects.

His production team is managed by David Bryce, who has been associated with Cliff from his early years, and who ensures the high standards of presentation are maintained. The technical team includes production and design manager John Seymour, lighting design and operator Bob Hellyer, sound engineer Colin Norfield, and monitor engineer John 'JJ' James.

I talked with Bob Hellyer, Cliff Richard's lighting designer for the past eleven years, at his Avolites control desk in the middle of the Arena at the Birmingham NEC. He described the concept of the lighting, explaining that in order to set up a show of this size they had

to take over the Wimbledon Theatre prior to the tour, where they spent almost a week setting up and rehearsing. In hindsight, due to the complexity of pre-plotting the lighting sequences for a repertoire of 27 numbers, he reckons that in the future they would probably allow two weeks for the task. It can take them up to two hours to plot a number which can have a sequence of between twenty to fifty cues - not to mention additional sequences brought in as 'feel' cues!

To keep up to date with the latest technology Cliff has with him, for the first time, a rig of 'Starlites', the new intelligent moving lights from Tasco's moving light company. Some of the features include the latest advances with this equipment, such as proportional movement, which ensures that all the lamps end up at their designated positions at the same time. In their narrowest focus, the units can give a 6" pencil beam and a brighter light output. The units are controlled by a Tasco custom-built desk, which utilises an IBM micro computer with specially designed software, and includes a colour video screen, which illustrates in graphic detail the animated patterns created by each light, along with other associated back-up details and instructions.

The lighting control desk for the remaining rig is an Avolites' Rolacue. This will soon be upgraded to the new Avolites QM 500 180 channel, optional pre-sets desk, which has 400 real level memories available on 20 faders, and a 20 memory chase, accessible simultaneously on two chase controls amongst its features.

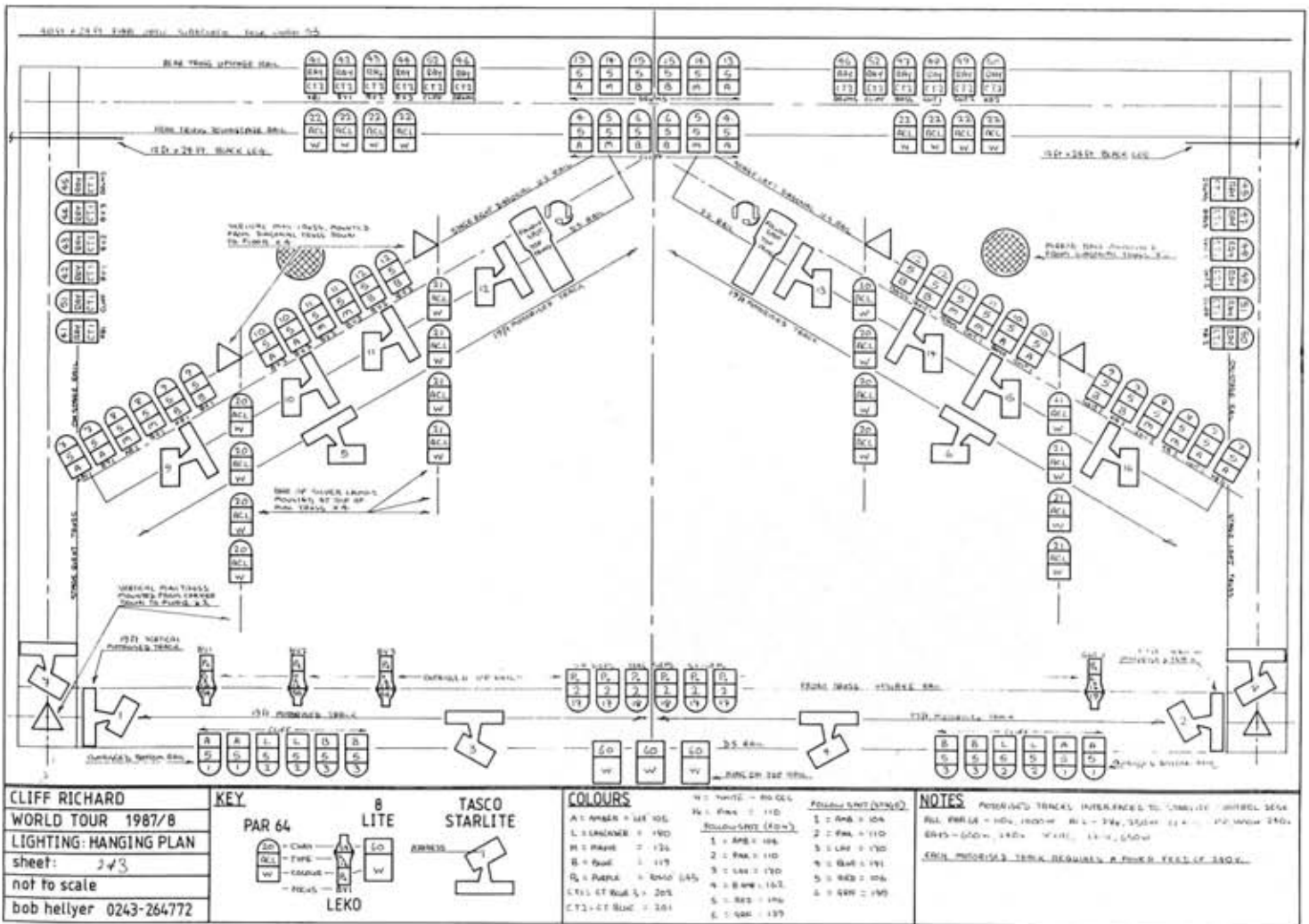
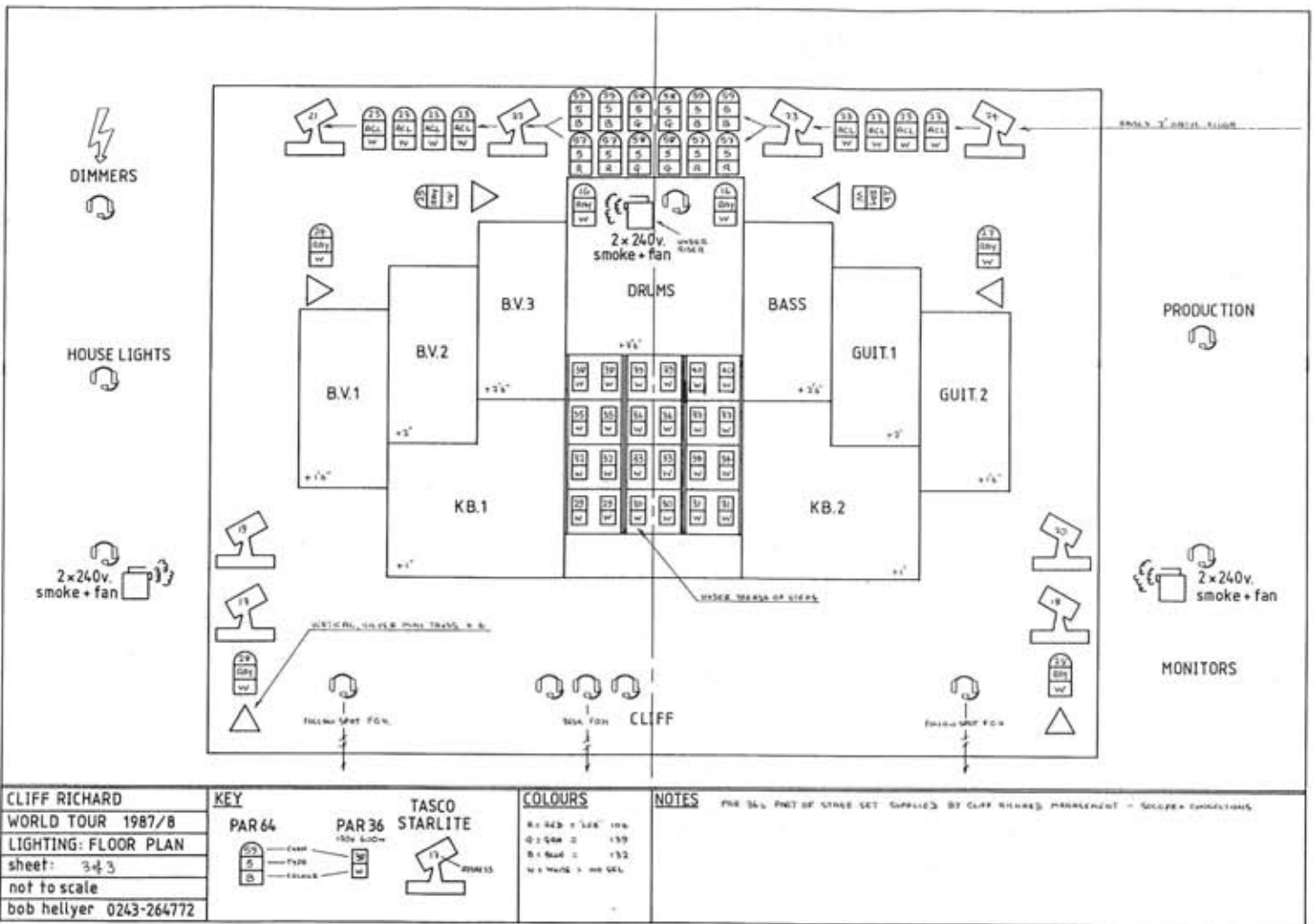
"It's a totally combined team effort to run these two lighting desks with four follow spots," said Bob Hellyer. He claimed that Cliff's charismatic approach to his lighting is an attraction: "It is a challenge to do his lights as they are so precise, and there is so much light and dark in his songs that you have a licence to be creative." Cliff has specific numbers which he choreographs with his lighting, explaining each move precisely, being very involved in the production of his shows, and he looks closely at every sequence from the front, also listening to a



Bob Hellyer - Cliff Richard's lighting designer.



Martin Lubach, Starlite technician, operator and designer.





'I'm Alive' - 'Always Guaranteed' World Tour 1987/88.

Photo: Bob Hellyer



'The Rock Connection' - with circular light frame being lowered.

Photo: T. Wassif

tape of his own music.

Talking about the 120 light rig, Bob explained: "It's almost a third of the size of Cliff's previous tours, due to his request to use moving lights this time. We decided not to use them as expensive special effects but to be the basis of lighting for the show. With just the generic lighting for subtle moves, cross-fades, and a little bit of dynamics on the whites and that sort of thing, the essence of the show is down to the moving lights." Bob was also keen to emphasise that he creates each sequence to suit an appropriate situation, hoping for "non-repeatable" lighting states.

Two short-throw 400w H.T.I. follow spots on the truss and two Supertrouper arcs on the FOH bridges, are used as the follow spots. They are called by the head operator on an independent head set system and this allows Bob to concentrate on operating his own lighting desk and cueing the moving lights operator, alongside him at the Starlites desk.

Designing Cliff's stage set, explained John Seymour, requires making a model and then photographing it from every angle to examine the sight lines to ensure an uninhibited vision from every viewpoint. One of the specially-designed pieces for this show is a remotely controlled moving set of motorised folding steps, with internal light units, which creates a mini 'wall of light' effect when fully extended behind Cliff in the centre of the stage.

The truss is a 27 foot Slick ground support system. The double pulley system on the top of the vertical support allows the motors to ride up the truss support. Each corner block has 16 wheels that push on to the top corners of the truss. Once set into position the motors are turned off and the vertical supports are then taken away to form a suspended mini-beam truss.

Looking at Colin Norfield's and John 'JJ' James' notes on Cliff's own sound system, from their brochure named 'Wired for Sound', the description seems an understatement when you look around this vast arena with rows of speakers along the pros and stacks in every corner! Judging by the 'stomping' and 'swinging' of this 'full house' and at other times their motionless concentration, it is obviously all taken into account, right down to the farthest spectator.

A good clean vocal sound is the reputation Cliff holds, and this must be attributed to Colin and JJ's expertise and experience in their field. Cliff's specially-designed dual sound system has almost 10kW of stereo power for his band, and a separate 5kW vocal system for himself to get over the top of the band when necessary, but without affecting their sound.

The sound equipment, which they developed from experimentation in the early 80's, and which they are continually updating with modern technology, is designed for versatility, and it is available for hire use when Cliff's not on the road with it.

Mixed by Colin from a Soundcraft series 800B mixing console, the system comprises for the Band sound, a Lindsey RPA 27 graphic equaliser, a 4-way system crossover, and Hill Audio 1000A amps on each side of the stage. These drive eight RCA 1 x 15" bass bins, six ElectroVoice 1 x 15" low-mid units, and four mid-range units housing four JBL 2482 horns - three on JBL 2350 flares, and



'The Rock Connection' - full stage set.

Photo: T. Wassif



'Silver' Concert, with lasers in use during 'Thief in the Night'.

Photo: Hanne Jordan



Gospel Tour 1984.

Photo: Martyn Tupper



John Seymour - production manager and set designer.

the other on a JBL 2355 flare, with four high-frequency units, each housing two JBL 2402 horns.

For the vocal mix, from the console, the system comprises a Roland 2 x 15 graphic equaliser, and a 3-way custom-built 'JJ' type crossover. To power six ASS Tony Rossell designed combination cabinets and on each side of the stage there are four Hill Audio DX 501 amps. Each cabinet houses two 10" ElectroVoice speakers, one above the other. Directly above them is a JBL 2425 horn with a JBL 2370 flare, on each side of which there is a Breymer CT20 tweeter operating on its own passive crossover at 8kHz.

Monitor engineer 'JJ' mixes the monitor system from his 26 channel input, 10 channel output, custom-built console with Hill and Crown power amps, driving a selection of ElectroVoice, JBL, Gauss and ATC speakers and horns.

Colin and JJ go to great lengths to provide the right sound. They work closely together, carefully satisfying the musicians on stage while at the same time ensuring as much of the band sound as possible is held under control by their relevant mixers, to achieve a good sound quality out front. For example, by encouraging sending the sound of the keyboards on stage through the monitor system whenever possible, a 'blanket' effect on the overall sound is avoided.

Keeping to a disciplined routine and holding a tight rein on the sound, avoiding escalating loudness while maintaining adequate control of the overall sound levels of the instruments, is of particular importance, they say. Every gig is taken very seriously in order to achieve good concert sound.

Freelance lighting designer Bob Hellyer, who has worked with such lighting companies at Entec and Supermick Lights, has lit all Cliff's shows since the mid 70's, and has also lit productions for the Three Degrees, Elvis Costello, Al Stewart, Black Sabbath, Olivia Newton John, The Motels, The Pretenders, The Shadows, and Barbara Dickson. More recently, when not touring with Cliff, he has lit shows for Rory Gallagher, China Crisis, and Shirley Bassey.

ing, electronics, design and production



Colin Norfield - sound mixer.



John James - monitor mixer.

Production manager John Seymour, sound engineer Colin Norfield and sound systems engineer John 'JJ' James, who have all been with Cliff since the late 70's, have come from a combined background of sound engineer-

management with such companies as the Orange Musical Industries PA division. Their combined expertise has included productions throughout the world for artists such as The Shadows, John Miles, The Temptations, Gladys Knight and the Pips, Richie Havens, The Four Tops, Dionne Warwick, Helen Reddy, Dave Brubeck, Petula Clark, Ike and Tina Turner, Mud, and Roy Orbison.

Since the recent conception of Cliff's own sound and production company TSP (Twin Sounds and Productions Limited), clients who have used their 'complete concert package' facilities have included Bucks Fizz, Kim Wilde, Everly Brothers Reunion Concerts, U2, Elvis Costello, Hazel O'Connor, Petula Clark, and Marti Webb.

Some of Cliff's more recent shows - since his Silver anniversary tour which included a 6 week sell-out season at London's Apollo Victoria Theatre in 1983 - include Cliff and the Shadows reunion concert at the Wembley Arena and NEC Birmingham, a British Gospel tour, and The Rock Connection tour which included playing in Japan and Australia in 1984. In 1985, before going into a year's run with 'Time' at London's Dominion theatre, Cliff toured Europe and played some Gospel dates. Since then, in 1987, he toured England with his Gospel show 'Beyond Time'.

To some the name of Cliff Richard seems as old as the hills, and also reminds one or two of us of not only how old we are but also where we came in!

Cliff Richard has received accolades such as 'The Annual Music Therapy Silver Clef' award for his services to the music industry, and in 1980, as well as being voted Best Family Entertainer, he received the OBE.

'Always Guaranteed' is an appropriate title for a world tour by the everlasting Mr Richard, who keeps his bandwagon rolling along through the years and between the generations.

And there are more gigs to come before the year is out. Catch him if you can . . .

Cliff Richard - 'Always Guaranteed' World Tour 1987/88

Lighting Equipment Schedule

42ft. x 30ft. Box truss, with 2 x 20ft. diagonal trusses as 1.
"Slick" 2ft. Square truss,
6 x 25ft. Silver mini truss.

2 x 20ft. Scaff. poles,
2 x 12ft. Scaff. poles,
2 x 5ft. Scaff. poles,
8 x 3ft. Scaff. poles,
8 x 2ft. Scaff. poles,
100 Swivel scaff. clamps,

6 x 3ft. Snap braces,
20 x 2ft. Snap braces to fit "Slick" truss.

6 x Bars of 6, Par 64 No. 5
1 x Bars of 6, Par 64 No. 2
4 x Bars of 6, Par 64 Ray lights
4 x Bars of 4, Par 64 A.C.L. 250W black cans
4 x Bars of 4, Par 64 A.C.L. 250W silver cans

4 x Leko 6 x 16 with iris 240v
8 x Single Par 64 Ray light cans
3 x 8 Cell Mole Fey, with hook clamps
16 x "Tasco" "Starlites"
12-way A+B intercom, plus spares
3 x Smoke machines, plus fans
2 x 18" Mirrorballs, c/w motors, 2 pulleys and black rope
2 x Supertroupers, F.O.H. follow spots
2 x 400W H.T.I. truss follow spots (6 colour) c/w seats
1 x QM 500 AVO control desk
1 x 100M 3-way control multi. with 2 intercom lines and mains

24 x 5K AVO dimmers
48 x 2K AVO dimmers

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6 x motors and associated rigging etc
Facility for 20 240v 15A power supply sockets distributed about the truss and stage, switchable at dimmers
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EQUIPMENT *News*

High Density Pack from Zero 88

The Rackmaster 260 is the latest addition to the Zero 88 range of professional dimmers, and the result of many years experience in the manufacture of top quality dimmers for the entertainment industry.

The 'high density' pack is designed to use as little space as possible and Zero 88 have engineered a full 60 amp dimmer confined into an incredible 2U high, fan-cooled case. Rackmaster 260 has diagnostic indicators on the front panel, and each pair of channels has its own P.C.B., so that in the unlikely event of a component failure, a maximum of two channels will be affected; it may be wired single or three phase using either Star or Delta supply, and will control resistive and most inductive loads. In addition to these features, the Rackmaster 260 has the added advantage of a thermal cutout on each P.C.B. to prevent overheating.

For further information contact Zero 88 Lighting Limited, Hart Road, St. Albans, Herts telephone (0727) 33271.

Quick Release Gaffer

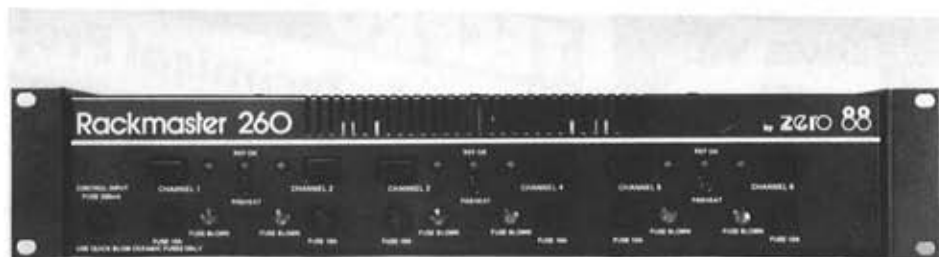
Further to many requests from customers using standard 'Gaffer' tapes for a quality tape that would release from the roll without using excessive force (common in roll widths above 50mm) Le Mark has introduced LM 180/QR* (*QR stands for Quick Release). This new tape has very good adhesion to most dry surfaces, and samples and colour charts are available direct from Le Mark.



Testing the new LM 180/QR at Meteorlites.

The new tape will make life a lot easier for rigging and securing lights at height, and Stuart Gibbons of Le Mark told L+S he was grateful for the help given by Meteorlites who co-operated in the testing of the product.

Full details from Le Mark Self-Adhesives Limited, Unit 24, Stephenson Road, St. Ives, Huntingdon, Cambs PE17 4W telephone (0480) 494540.



The new high density Rackmaster 260 from Zero 88.

Q-Max 7000 from McKenzie

McKenzie Acoustics has produced a four channel stereo mixer to join its Q-Max series of products that already includes the 600 stereo Mosfet power amplifier; the compact, portable, full range, modular 7000 system PA; and the more recent 7000 dual ten band stereo graphic equaliser.

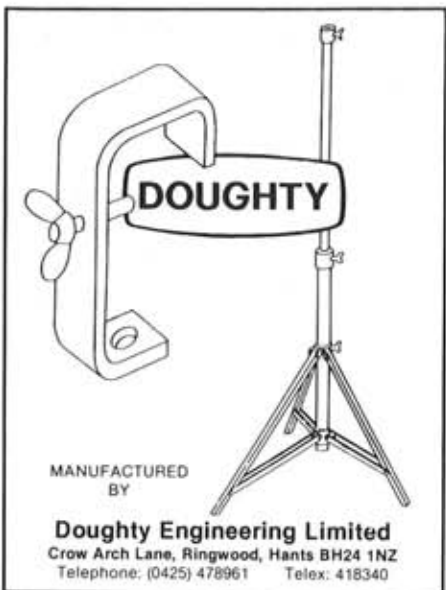


The new McKenzie Q-Max 7000 stereo mixer.

Aimed at disco and club installations, the 3u high rack mounting Q-Max 7000 4 channel stereo mixer has stereo phono inputs, both equalised for magnetic cartridges. Features of the unit include bass, treble and level pre-set controls, stereo tape input, a balanced microphone channel with bass, treble and level control, switched cueing with headphone volume control and bargraph LED meter control.

For details contact McKenzie Acoustics Limited, Albion Drive, Thurnscoe, S.Yorks telephone (0709) 898606.

LOTS MORE EQUIPMENT NEWS IN OUR MARCH ISSUE!



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The Batmink Mini-Moonbeam unit.

Batmink Moonbeams

Batmink Limited of Glastonbury in Somerset now have stocks of their Mini-Moonbeams and Scanning-Moonbeams. Each of these effects project a radiating fan of twenty-one rotating shafts of white light, produced by a single 12v 50w halogen lamp. Separate lamp and motor circuits enable the user to stop rotation when desired. In the case of the Scanning-Moonbeam, the light head scan is adjustable from 0° to 355°.

The Mini-Moonbeam measures 901mm x 110mm wide x 260mm deep, the Scanning-Moonbeam is 2801mm x 240mm wide x 260mm deep. The units are British made, and available exclusively from Batmink Limited and their selected distributors.

For full details and prices contact Batmink Limited, The Glastonbury Warehouse, Silver Street, Glastonbury, Somerset BA6 8BT telephone (0458) 33186/33451.

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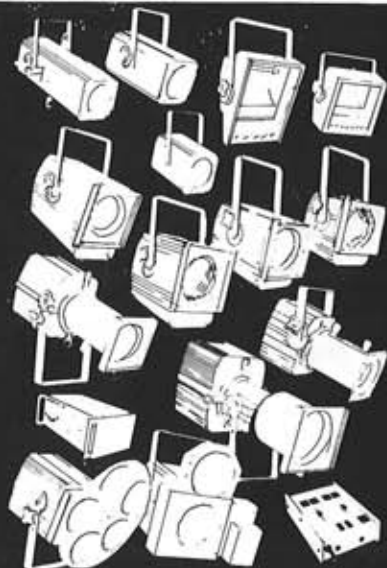


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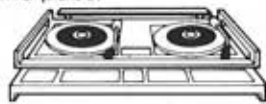
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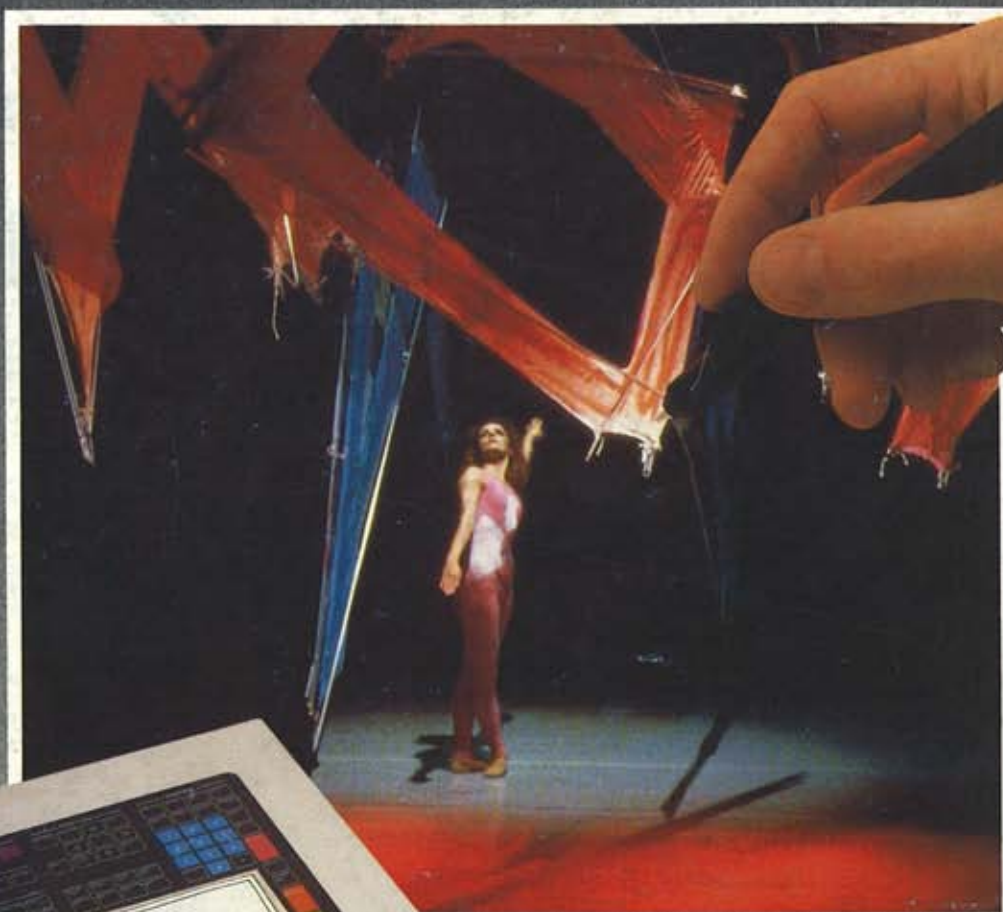


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