

# ENG INF

*Spring 1988 No.32*

## NEW RADIO OB VEHICLES

Radio OBs has recently taken delivery of four new Type B and seven new Type C vehicles. The medium-sized Type Bs are destined for Birmingham, Cardiff, Glasgow and Manchester while a further four may be built in the near future to replace old Type Bs still in use at Belfast, Bristol, London and Manchester (which will then have two). The smaller Type Cs are destined for Bangor, Cardiff, Edinburgh, Glasgow, Leeds, Norwich and Swansea.

The task of designing these replacement vehicles fell to the newly-formed Radio Capital Projects (RCP) department who used the opportunity to extend and improve the facilities on offer, bearing in mind the increasing demand for cost effectiveness.

### THE NEW TYPE B

Like the original vehicle, the new Type B is capable of recording programme directly onto quarter-inch tape or sending it by land line, via its line-send amplifiers and tailboard panel terminals, to a studio centre for recording or transmission. It also has to fill the gap between the large Type A vehicle, with its multi-track recording facilities, articulated chassis and computer-assisted mixing desk, and the small Type C, with its de-riggable mixing desk and basic facilities, earlier versions of which were known affectionately as 'the ice-cream van'.

The new Type B is intended to be the workhorse of the three vehicle types. With its improved acoustics and equipment, it will be used for some high quality productions which, in the past, would have required a Type A; for example, major orchestral and choral concerts.

The vehicle will be staffed by a Sound Supervisor and supported as necessary by additional operational staff.

Several alternative chassis options were considered. RCP Project Leader, Keith Harte, chose the Leyland Freighter T45, 13.14 chassis as the base for the new vehicle, chiefly because of the availability of five wheelbase options. The wheelbase chosen - 4.66m - allows the mixing desk to be situated above the wheel-arches which, otherwise, would have protruded into the working area. The chassis height - 3.2m - is also slightly lower than others that were considered. During the design process, BBC Cardiff requested that vehicle height should match that of the previous Type B, since some of their regular OB venues are Welsh castles whose architects had, regrettably, failed to allow for vehicles that were much higher than this when designing their arches!



*The New Type B vehicle*

### The Mixing Desk.

The mixing desk is a CALREC 40-channel unit, with eight stereo groups, incorporating new facilities such as group re-mixing (which allows any group of channels to be fed to any other group input). Thus one group fader can control

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# Editorial

Alan Lafferty leaves EID on 5 April for a one year attachment as Tour Manager of the IEE 1988/9 Faraday Lectures. He will be assisted by John Pinniger, also of EID, and the first lecture is in Liverpool on 12 October. John Brooks, the Project Leader, will shortly appoint the lecturers who will deliver the BBC's presentation, which will be called "Sound and Vision". On behalf of all readers, I would like to wish everyone concerned, a very successful and problem-free tour. Hopefully, those of you who are IEE members may get a chance to attend the lecture - the next edition of 'Eng Inf' will list the seventeen venues with dates.

While Alan is away, David Lees of EID will be the Acting Manager, Engineering Promotions, and he will take over responsibility for organising this year's crop of exhibitions, among other things. Those EID is involved in include: MINT (Motor Industry New Technology) at G-MEX, Manchester, in June; IBC at Brighton in late September; shortly after, the BBC Radio Show at Earls Court (which will see the official launch of RDS) and the Motor Show at the NEC, Birmingham, in October.

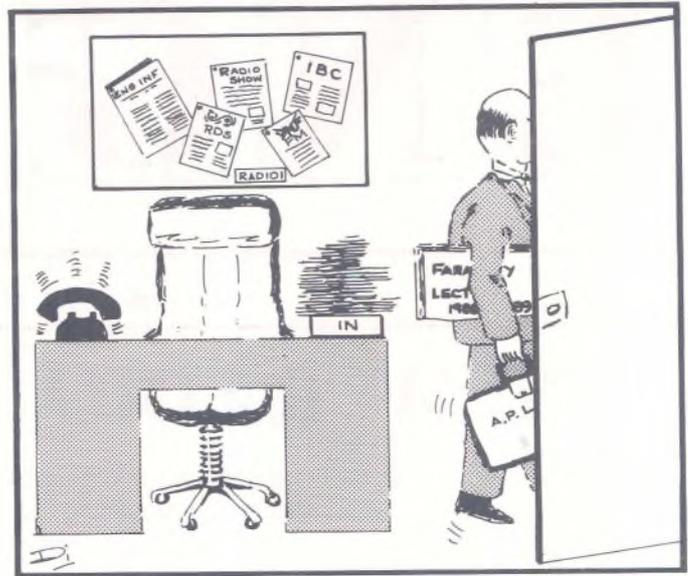
Without going on too much about EID, I would like to welcome Mick Gleave to the fold. Mick recently joined us from Design Group, D&ED, as assistant head of department (AHEID). He has kindly offered to write an article on the different types of MAC, for a future edition of 'Eng Inf'.

I was very grateful to receive a healthy number of articles for this edition. However, I would have appreciated some more stories from the regions. So, if any readers outside London have an interesting story to tell about new developments or facilities in their area, please let us know. The deadline for the next edition is 3 June and all contributions will be gratefully received.

Mike Meyer, 25 March 88

## Licence Agreement

There have been no new manufacturing licences issued since the last edition of 'Eng Inf' but discussions are in hand with a number of companies, concerning items from both D&ED and Research Department.



## Design and Equipment Department

Design Group and its support services will be moving from Western House to Avenue House in early June and will thereby complete the amalgamation of the old Design and Equipment Department into the new D&ED.

The transfer of all the staff and facilities to Chiswick is likely to take three to four weeks during which some disruption of normal service is inevitable. Every effort will be made to keep this to a minimum.

The next edition of 'Eng Inf' will carry a feature on Design Group and the services it provides.

## Transmitter News

The following stations have opened since 1 January:

### Television

Balmullo	Tayside
Broneirion	Powys
Newchurch	Lancashire
Port Isaac	Cornwall

### FM Radio

High Wycombe	Bucks
Kirkton Mailer	Perthshire
Ridge Hill	Herefordshire
Stanton Moor	Derbyshire

Kirkton Mailer has replaced the Perth relay, using the same frequencies.

## OB VEHICLES

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several other groups and can be used, for example, when a soloist or small group of artists is being backed by a large orchestra. The orchestral backing, while comprising several groups such as strings, brass, etc, can be adjusted in level relative to the soloist by a single fader.

Five auxiliary outputs are provided from the desk, one of which is stereo, and each of the forty input channels and eight groups may be routed to any of these outputs, or to the PA output.

### Tape Machines

The complement of tape machines in the new Type B has been increased to five, with one Studer A721 cassette unit and four Studer A810 open-reel machines. The start/stop/spool functions of the open-reel machines are controllable from a desk remote panel and all machines may be monitored either on the panel in the tape area or on the desk.

### Monitoring

A selector on the desk gives the operator both PPM and loudspeaker monitoring of thirty-eight points in the system. The loudspeakers supplied are the large BBC LS5/8A professional units while a pair of Foster 6301XT domestic quality speakers allows him to empathise to some extent with the listener, by simulating the sound from the average home stereo system.



The Type B's Calrec sound desk

### Monitoring and Output Unit.

A Glensound Monitoring and Output Unit (MOPU) directs control-line traffic into and out of the vehicle, using a simple two busbar system. It is also largely responsible for the origination and routing of talkback, having its own front

panel microphone and an input socket for a Producer's talkback box. (Talkback may also be originated from the mixing desk microphone). The MOPU also adds to the monitoring facilities, providing four headphone outputs that can be selected individually to any one of fourteen points and which are also on the talkback system.

The MOPU acts as the interface between the desk and the tailboard land-line terminals. It was originally designed for portable use but its comprehensive facilities and compact size make it very suitable for use in the Type B.

### Cueing.

Off-air aural cueing is provided by an fm/mw/lw radio and a uhf tv tuner, which also provides visual cueing via a 20" colour monitor. The vehicle is fitted with a 15 metre Clark PT15 pump-up mast which can be rigged with vhf or uhf receiving aerials, as required. An Avitel vision switching system, operated from a desk panel, can connect the tv monitor to one of four sources, including a domestic type video camera and the off-air signal from the tuner. An incoming and outgoing cue-light system is provided on the MOPU.

### Supply Considerations.

An OB vehicle may have to operate to full capability in locations where no specialized power supply arrangements are available. Hence, RCP and the coachbuilders, A. Smith (Great Bentley) Ltd of Colchester, have made special efforts to ensure that the overall power consumption of the vehicle is as low as possible: the equipment can be powered in its entirety from two domestic 13A sockets. It may also be powered from a BS4343 60A socket or from a generator if no mains supply is available.

In the event of mains failure, although most programme facilities will be lost, a standby battery will power all external and some internal lights, the vehicle alarm system, the mast compressor and the MOPU, which will maintain communications and talkback.

### Alarm System.

The alarm system for the Type B has to fulfil two requirements. Its first purpose is to prevent unauthorised access to technical equipment but it also has to warn the driver of any unsecured areas, before the vehicle is driven. Unauthorised entry is announced by a

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113dBA klaxon while a considerably less disturbing, but equally effective, alarm and mimic panel informs the driver if a locker door remains open, as he switches on the ignition.

#### Improved Environment.

Anyone who has worked on the site of an OB will know the importance of a technical area that is comfortable to work in, as well as being operationally efficient. However the OB vehicle that is well insulated and soundproofed, and which remains pleasantly warm with little heating in winter, can become uncomfortably hot in summer.



*An old Type B vehicle*

For this reason, the coachbuilder was asked to fit an efficient air-conditioning unit, providing heating and ventilation as well as cooling - a considerable advance on the old vehicle in which ventilation and cooling were achieved simultaneously, by switching on the ventilator fan. Heating was sometimes catered for by a diesel-burning heater but, because of the fumes that often accompanied its use, staff quickly developed a preference for a small electric fan heater.

In designing the new air-conditioning unit, considerable attention has been given to preventing induced switching pulses, which could cause clicks and plops to appear on programme sound. A diversity system is employed, whereby the compressor runs continuously: on achieving the required temperature, it does not switch off but instead, the coolant flow is pumped round an alternative circuit which does not include the evaporator in the working area. A similar degree of care is taken with the heater element supply, which employs zero crosspoint switching.

In very cold weather, extra heating is

available from a diesel oil burning vehicle heater. This has the added facility of a timer and can be set to warm the vehicle on a cold morning before staff arrive.

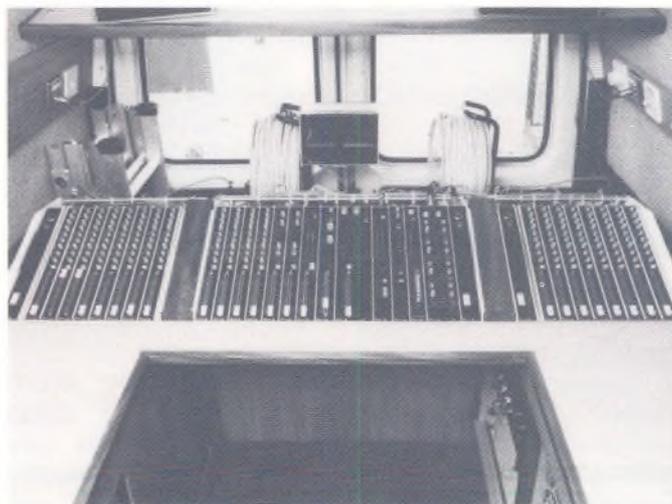
The interior of the vehicle is well lit, with both dimmer-controlled tungsten light tracks and fluorescent fittings, while external lighting illuminates both the access steps and the ground around the vehicle.

In the Type B, RCP has aimed at producing a vehicle of such versatility that only those who operate it will discover its full potential. It is hoped that the first customer, Cardiff, and indeed all the BBC regions that are to receive the new vehicle, will agree that this aim has been achieved.

#### THE NEW TYPE C

The Type C is an operator-driver OB vehicle which is used at small venues such as church services, conferences, quizzes, Gardener's Question Time and simple sports events. The twenty-channel Glensound MX6C stereo mixer is de-riggable and can be carried into a hall, for example. There is provision for connecting three portable tape machines, such as the Nagra IVs, and monitoring is via a pair of LS5/9s.

Like the Type B, it has been designed to run from two 13 amp power points; one providing the technical supply, the other for general use including heating (a 1kW fan heater is available at floor level). An economic ventilation system is fitted, where warm air going out heats colder air coming in, without consuming much power. If no mains supply is available, there is



*The New Type C's de-riggable mixer*

a separate 24V technical battery which the vehicle's alternator can simultaneously charge, along with the vehicle's 12V battery.



*The New Type C vehicle*

Being a relatively small vehicle, the internal space is rather restricted but intelligent use of the driver and passenger seating has been implemented. The driver's seat can be rotated through

180 degrees and the passenger bench-seat folds over to provide a total of three rear-facing seats, for production staff. All the windows have curtains or blinds to keep out unwanted light and a canopy can be pulled over the open rear doors to offer some protection from the weather when rigging/de-rigging.

The new vehicle is based on a Ford Transit 130 van, with long-wheelbase and high-roof options. Wadham Stringer, of Waterloo-ville, fitted a full-height side-entry door on the nearside, replacing the original sliding door, while the interior work was carried out by Megahertz Comms Ltd, of Newmarket. This included all the benchwork, power and electronic wiring, the roof vents and a fixed side window on the off-side. The RCP project leader was Alan Norman.

Many thanks to Ken Hancock of Technical Publications for supplying the text on the Type B vehicle and all the photographs.

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## THE RACE IS ON!

Engineers at Research Department are taking a major part in the RACE projects run by the Commission of the European Communities. The BBC is leading one of the forty-three projects, playing a large part in another, and a smaller part in a third. Work on RACE projects is 50% funded by the European Economic Community - so participating in RACE allows the BBC to carry out research work that it might not otherwise be able to do.

RACE stands for Research and development in Advanced Communications technologies in Europe. Its object is to make technology available for the building of a Europe-wide digital communications network using optical fibres. As each fibre can transmit thousands of millions of bit/s, this network could carry not only the telephone traffic carried by today's networks but also broadband signals such as video conference signals, broadcast-quality sound and television signals up to HDTV quality. This network is sometimes referred to as the Integrated Broadband Communications Network (IBCN).

Organisations involved in RACE are network operators such as British Telecom, industrial companies such as Philips,

universities and independent research institutes, and telecommunications customers such as the BBC and the EBU. RACE is organised into projects, each dealing with an aspect of the IBCN; each project must include partners from at least two EEC countries.

### The BBC-led Project

The aim of this project is to develop a broadband Customer Premises Network that can carry digital video, sound and control signals with a wide range of bit-rates, including HDTV. 'Customer Premises Network' is RACEspeak for the sort of routing system that is used in a studio centre - but the system to be developed will be an integrated digital system using optical fibre. This single system could replace the many levels of routing and the many different sorts of cable used for signal distribution in present-day studio centres.

The system to be developed will multiplex together all the signals from all sources, combining them all onto a single fibre for distribution to all destinations; selection of sources then takes place at destinations, rather than

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using a central control room as at present (of course there would still be a need for some central functions such as monitoring and dealing with outside lines). To combine all the signals needed in a large studio complex like Television Centre, you need a bit-rate of more than 30 gigabit/s. This very high rate will be achieved by using both optical wavelength multiplexing (combining different wavelengths of light on one fibre) and electronic time multiplexing (putting different signals in consecutive time-slots in a higher bit-rate signal). Special components for both forms of multiplexing will have to be developed in the project because of the close wavelength spacings and high bit-rates that are needed.

The other partners in this project are GEC and STC from the UK, Thomson-CSF, SGS-Thomson Microelectronics (STM) and Jobin-Yvon from France, SESA-Alcatel from Spain, and the research laboratories of the Netherlands PTT (the Dr Neher Laboratory - DNL). STC are making the high-speed lasers that generate the optical signals and Thomson-CSF are making the receivers; GEC are making the star coupler that combines the different optical wavelengths and Jobin-Yvon are making the demultiplexer that separates them. STM and SESA-Alcatel are collaborating on the electronic time-multiplexing while DNL are developing the control system for the network. The BBC's role is the management of the project, the overall system design, and the construction of the testbed that will show that all the high technology can be made to work.

This project is a BBC initiative, so BBC engineers - led by Special Assistant to DE, Brendan Slamin, and Head of Baseband Systems Section at Kingswood, Tim Shelton - had to find partners to form a RACE consortium. They made contact with most of the big manufacturers of optical, telecommunications and broadcasting equipment in Europe. Several well-known companies initially showed enthusiasm but then backed out - one of them only two weeks before the closing date for proposals - leaving gaps in the project plan that had to be filled at very short notice. Then Research Department had to prepare the proposal document for submission to the RACE office in Brussels. This was a much bigger job than expected: the final document was over 300 pages long. The proposal was compiled by Andrew Oliphant, Richard Marsden, and John

Zubrzycki in Baseband Systems Section - with the help of the Drawing Office, nearly every secretary and most of the Print Room staff at Kingswood, assisted by the Design Group Print Room at Western House.

The BBC project was one of more than ninety proposals submitted to Brussels for evaluation. During the evaluation period, these proposals were subjected to close scrutiny by international panels and the BBC project was one of the forty-three that survived. There followed a month of tense negotiations with the European Commission when the emphasis was shifted from component to system development (though a good deal of component research and design still remains). This resulted in a considerable reduction in the value of the five-year project to its present figure of eight million ECU (£5.5M) - and in two re-writes of the 300-page proposal document within that month! Finally the consortium was awarded a contract for the first year, with future renewal depending on success in this first stage.

#### The Video Coding Project

Baseband Systems Section engineers are also playing a big part in the HIVITS RACE project, led by Thomson-CSF. 'HIVITS' stands for 'High quality Videotelephone (and high definition television) System'. The aim of the project is to develop transmission coders and decoders for the very wide range of digital television signals that are expected to be carried in a future European IBCN, from videotelephone communications to HDTV whose initial bit-rate may well be over one gigabit/s. The BBC has a particular interest, and can offer experience, in establishing the standards for the high-quality end of the range. Other partners in the project include manufacturers, universities and telecommunications administrations from eight countries.

The first phase of work in HIVITS is to devise coding schemes to reduce the very high initial bit-rates of digital television signals to more manageable levels. Even with the bit-rate available in an optical fibre network, transmission at the raw bit-rate might never be an economic proposition. This is not a new problem, but the degree of reduction needed (up to a factor of eight), together with the need for the very high picture and sound quality that the public have come to expect from broadcasters, mean that the engineers will have to be very

clever if the bitrate-reduction processing is not to cause unacceptable impairments.

Nick Wells and Mike Knee are working on the picture coding schemes which will probably make use of Discrete Cosine Transform coding and will also involve prediction of each frame of the signal from the previous one, with compensation for the different speeds and directions of motion in the scene. In the Discrete Cosine Transform technique, information about the two-dimensional frequency content of the picture, rather than the original spatial representation, is transmitted.

Neil Gilchrist and Andrew Stirling will be working on the sound coding part of the project. Their group will make a choice from the most promising techniques for reducing the bit-rate of the digital audio signal component of both future 625-line and high-definition television. Again BBC concern will be to maintain quality standards.

After the first year, the task of the project will be to design and build demonstrator codecs, both for the point-to-point transmission of conventional and HDTV signals and possibly for the distribution of those signals direct to people's homes through optical fibre networks. This will involve the development of new integrated circuits. One of the goals is to ensure as far as possible that there is hardware compatibility across the range of bit-rates and television standards. The BBC will need such codecs to meet its future transmission requirements and particularly for the proposed self-provided network.

#### The Mobile Project

The third RACE project with BBC involvement is the Mobile Telecommunications Project, led by Philips. The main object of this project is to develop low-cost mobile telephones. The BBC interest in this work - represented by Peter Shelswell, Head of Transmitters and Propagation Section - is to ensure that facilities for Outside Broadcast communications are built into the system at an early stage. The broadband services should provide facilities for sound contribution circuits and may also provide facilities for television OBs in addition to the present network.

RACE will have an important effect on the

future of communications in Europe. The BBC's involvement will enhance its reputation as a forward-looking broadcaster; It will ensure that the technology is available for the routing systems that will be needed in the studio centres of the future and for video and sound transmission coding. It will also make sure that the BBC's future needs are considered in the planning of the mobile network in particular, and in the IBCN as a whole.

Mike Knee, Andrew Oliphant and Peter Shelswell  
Research Department

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## Westminster Studio refurbished

News & Current Affairs' Westminster studio has recently undergone a much needed refurbishment. Located on the ground floor of the Norman Shaw Building, near the Houses of Parliament, the studio is now fully integrated into News TAR and will soon be extended to N1, N2 and N3 at TC. Remote control has been provided for camera movement and functions, lighting, audio levels and cues. Also, the heart of the studio - an 8 x 4 Probel matrix - can be controlled from SCAR at The Centre.



*The remotely-controlled Westminster Studio with its familiar backdrop*

The remote control system is an extension of that already provided by Vinten in the news studios at Television Centre and the tv studio in Broadcasting House. Separate data links are used for the main camera and the ancillary facilities while full local control can be adopted for engineering tests.

The studio has a single Bosch KCP-60  
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camera, covering both the presenter's desk and an interview set, with a stand-alone Sony DXC 3000P providing emergency back-up. Lighting is provided by 1kW spots and soft lights.

The presenter's desk is fitted with main and back-up microphones (switched remotely) and two cartridge players are available. The presenter has local control of his earpiece feed (TC cue, Off Air, cart machines, House of Lords, House of Commons) as well as earpiece level, loudspeaker cut, on-camera prompt source and camera monitoring. The more important functions are also controllable from the news studio galleries at TC. Monitoring facilities are kept simple using grade III colour monitors for vision (camera, Off Air and TC cue) and an LS3/5A loudspeaker for sound (TC cue).

An adjacent interview set comprises a table, two chairs, two stand microphones, two grade III colour monitors (camera, TC cue) and a selectable earpiece feed.

The clock pattrass contains, in addition to the normal On Air, cue, telephone and fire lights - a Division Bell light (although we've yet to see an MP leave his seat in mid-interview!).

Sound remote control is implemented using two purpose built units from Ian P Kinloch and Co. These units are to be used in small remotely controlled studios throughout the regions. The 8 x 4 four-level matrix allows SCAR to route signals from the studio cameras, Bridge Street psc, local ENG, House of Lords or a test generator to any of Television Centre, Broadcasting House, LOCO or local monitoring.

Air conditioning and studio decoration are provided by the Property Services Agency of the Palace of Westminster.

There is no technical attendance at Norman Shaw because interviews and contributions occur on an ad hoc basis. However, ten or twelve bookings are typical in a single day, making this one of the BBC's most productive studios.

The re-furbishment work was undertaken by two contractors - Vinten for the remote control and IP Kinloch & Co for the studio facilities - to a specification drawn up by P&ID Tel. The contracts were supervised by Rick Dines and Mark Mallard.

## Temporary Studios A and B in Cardiff

Since the beginning of the year, the Cardiff TV studio, C2, has been undergoing a complete technical refurbishment which is likely to keep it out of service for thirteen months. Early in the planning stage, it was realised that a temporary replacement studio would be required but an added complication was that the adjacent Annexe Studio would be affected by the building operations and would also have to be replaced. The requirement, therefore, was for two temporary studios.

Radio Studio 2 was identified as a possible replacement for C2 and it was decided that the existing Annexe Gallery could be used with this area, to form Studio A with a floor area of around 93 sq metres. However, this left the problem of replacing both the Annexe Studio and control areas.

A conference room was identified as another possible studio with CMCR16, due to come off the road in November 1987, as its control area - a combination now called Studio B with a floor area of about 15 sq metres.

As the change-over to these temporary studios would have to take place during weeks 51 and 52, including the Christmas period, most of the new facilities would have to be installed and tested before the change-over. Various options were considered but eventually it was decided to move the vision and lighting control desk, including the complete Strand MMS from C2, to the new area. The advantage of this approach was that the users were familiar with the existing desk.

### Studio A

Conversion of the radio studio involved the design, prefabrication and construction of a free-standing lighting structure which also supports a twin cyclorama track. The centre part of the grid incorporates a section for rolling pantographs (ex-Studio C2) while remaining lanterns are supported on drop arms.

The wooden suspended floor of the studio was smoothed and covered with plywood which, in turn, was covered with thick industrial-grade vinyl floor material. This has resulted in an acceptable compromise, suitable for use over a limited period and very much less

expensive than the conventional solution.

Existing cooling and ventilation within the studio were inadequate for TV use and, as budgetary constraints prevented the provision of fully-silenced additional plant, split-back cooling units of 21kW capacity have been installed. Additional pipe-work is fitted to allow the rapid installation of extra units should this prove necessary. To keep noise levels down, the split-packs are switched off for transmission, the normal duration of live programmes not exceeding half an hour.

Three new technical wall boxes have been installed, each having identical facilities to those previously installed in Studio C2.

The Annexe Control Gallery has been divided to provide a separate sound control area, which involved moving the capgen operational position to an adjacent dressing room. Communications and a window have been provided between the capgen operator and the gallery.



*Cardiff's temporary Studio B*

Extra technical facilities in the Annexe include: a third camera channel, a Zeno DVE unit, Slide File, a larger preview matrix, an audio sub-mixer and additional communications.

The existing lighting and vision control were found to be inadequate and a completely separate LVCR with adjacent dimmer room, was formed. Lighting dimmers for sixty 2.5 kW and fourteen 5 kW circuits, along with an electricians panel, were provided and installed by a specialist contractor while a local contractor took care of the wiring from the dimmers.

#### Studio B

The contractor who provided the lighting grid for Studio A also prefabricated a grid structure for Studio B. A separate pack of dimmers for twelve 2.5 kW circuits was fitted together with an electricians panel on the studio floor.

Only one wall box was required and some quiet ventilation already existed. However, as in Studio A, extra cooling in the form of a split-pack has been provided.

When CMCR 16 became available, it was parked at the front of BH Llandaff, with access to and from the building by means of a covered way. Only two cameras were required but it was necessary to add control of BA/10 caption scanners, capgen, local router source selection and the lighting dimmer-rack associated with Studio B. In addition, the vehicle had to be fully integrated into the station's communications system.

#### Conclusions

The temporary facilities have been in use for two months at the time of writing (late February) and user reaction has been generally favourable. Most problems relate to the re-use of equipment which has already exceeded its sensible life-span!

Many people contributed to the success of this scheme:

- vision and audio operational staff, who helped determine the requirement
- Building Services who organised their contractors
- the Cardiff Projects Team who, with other electronic services staff, worked over the Christmas Holiday to re-install equipment and test the new facilities.

And finally, many thanks must go to the people outside Wales who gave us a great deal of help and advice.

Roger Farmer  
Engineering Services Manager, Wales

# New Sound Technology at TC

Last December, a new sound desk entered service in Studio 4 at Television Centre. Made by Calrec Audio, it marks a radical departure in sound desk design.

Recently, the demands of ever more complex programmes have dictated a steady increase in the number of channels needed on tv sound desks, typically fifty to sixty on a large studio installation at present. Furthermore, the number of facilities required on each channel has also increased rapidly: for example, individual equalisation, multiple auxiliary sends and more comprehensive dynamic control, ie compression, limiting, expansion and noise-gating, each of these with the possibility of side-chain equalisation.

The product of these two trends has been a vast proliferation of controls on the operational surface, typically 1,000 to 2,000 on a large desk of traditional design. This large number of controls has to be presented in a readable and accessible fashion which, in turn, has led to extensive miniaturisation, the use of dual-concentric controls and various other space-saving features. A balance has to be found between the need to present the maximum number of facilities and for the presentation to be sensibly operable, while also remaining easy to engineer and maintain.

The new assignable desk presents a radical solution to many of these problems and includes a number of additional facilities designed to make it easier and much more flexible to operate. The concept of assignability has already occurred in other areas, principally in lighting console design. The needs of television sound-mixing are, however, very different and a carefully considered balance had to be made between the need for instantaneous access to key parts of the programme chain and the desire to simplify the control surface to give clearer presentation and more rapid operation.

To achieve this, the channel faders are still retained on a one-to-one basis, providing instant and familiar access to the most essential desk feature. The fundamental departure from traditional practice is that the remainder of the channel strip (gain, equalisation, auxiliary send and channel dynamics) occurs only twice on the desk, on two

master 'assign' panels. The resultant saving in space permits considerable enlargement of the individual controls, leading to easier operator access and a much clearer display.

Operationally the desk is simple to use. Pressing the appropriate assign button above the fader causes the settings of the channel to be instantly displayed on, and controlled by, the assign panel.



*The new 'assignable' sound desk from Calrec, in TC Studio 4*

A further departure from convention is that the faders no longer carry audio but control remote channel cards. Hence, the association between a fader and the function which it performs (mono/stereo channel, group fader, vca master, etc) is no longer pre-ordained and the desk may be arranged with its group/channel faders positioned as required for the task in hand. Any fader may be mono or stereo, or may be made a vca master, controlling (without signal mixing) the outputs of several other channels. The former achieves both an efficiency in hardware and convenience in operation (the stereo channels being created from a pool of undedicated channels, much fewer than would otherwise be needed, yet with the ability to present them on any fader).

The system permits, for the first time, comprehensive interrogation of the signal paths established. It is an easy matter to establish which channels contribute to a particular output (group, auxiliary, etc) or to which output a particular channel is routed.

As part of the philosophy of providing rapid access where needed, the desk has an

undedicated rotary control above each fader. This 'wild' control, in addition to the one provided on the assign panel, may be used to present an auxiliary send or pan control in an operationally prime section of the desk.

All major desk operations are achieved simply by use of keys on the desk control surface. An accompanying vdu can, if required, give further detail on desk set-ups plus the ability to write track sheets, rigging sheets and other data. The accompanying pc handles the desk's comprehensive memory system; up to thirty entire desk settings (all settings of all controls) may be recorded onto floppy disc and recalled at will to reset the desk.

This provides the option of easily pre-setting the desk to any format regularly required plus, on large music shows, the ability to step the desk from one set-up to another at the touch of a button.

Electronically, the desk uses analogue circuitry for its signal paths and digital circuitry for their control. There is extensive devolvement of the digital processing power which, combined with duplication of key data highways and extensive battery back-up, promises reliable operation.

Laurie Taylor  
Sound Supervisor, Television Studios

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## New library system for N&CA stills

Maintaining a large library of 35mm transparency slides presents two major problems: firstly, how and where to store the individual slides and secondly, how to catalogue the collection efficiently.

At Television Centre, the News and Current Affairs department has about a million slides in its library. These are stored in suspension files, each holding twenty-four slides, in four-drawer filing cabinets. To accommodate the complete library, upwards of sixty filing cabinets are required and these currently occupy valuable space on the fourth floor of The Spur.

The catalogue system for the library is also vast. Using standard index cards, each slide is cross-referenced under Personalities, Subjects and Locations. Details of who holds the copyright, the date of the picture, when it was first broadcast and a brief description of the picture are also stored on these cards.

The slides for a particular programme are chosen by a New Organiser's Assistant or Stills Co-ordinator who works in conjunction with six or seven journalists in the News Room. The chosen slides are stored electronically in Rank Cintel's Slide File system, ready for transmission, but this only provides storage and recovery of the slides or stills which are needed for the next programme.

News programmes now rely on electronic devices to create and transmit stills and graphics. Often, stills grabbed from

moving pictures only exist electronically and the 'on-line' discs do not have the capacity for long term storage. The incompatibility between electronic devices and 35mm transparencies for storage has led to quality problems and a slower operation than is obtainable from fully electronic systems.

With the move of Newsnight and Breakfast Time to Television Centre, an electronic stills library was urgently needed on three accounts: firstly, to deal with the quality and storage problems discussed above; secondly, valuable space on the fourth floor spur could be released and thirdly, a greater number of electronic stills could be on-line in any one day to cope with the increased volume of work. A further benefit will accrue in the long-term, as the cost per slide is significantly less for electronic storage than for transparencies.

To gain space, most of the existing slides and other material would have to be transferred to high density storage units in the basement. This could only be achieved if a sophisticated computerised index of the material was available on the fourth floor, close to the editorial and graphics areas. This index, if used in conjunction with a greatly-expanded electronic store for regularly used stills, would keep reference to the basement archive to an acceptable minimum.

### The New System

The only electronic system available with  
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## NEW STILLS LIBRARY

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a large enough database to deal with the quantity of stills in the library is the Gallery 2000 system from Logica. This comprises central storage discs (magnetic or optical), managed by a computerised search and indexing system, with all picture input and output via Slide Files.

One of these systems has now been installed in an area close to News Graphics, by Julian Stone and John Passfield of Central Systems Section, P&ID Tel, under project leader Nigel Jackson. It will take several years to transfer the stills collection, with its card-index records, across to the new system and, initially, only slides that are required for broadcasting will be transferred. Rarely-used archive slides could remain in the old system for years to come although it is intended to transfer all the index records to the new system as quickly as possible. This would at least enable staff to quickly find what is available and where it is kept.

### The Record Store

Gallery 2000 has a central library system (with database) which can store up to three million records. Search times are typically no more than a few seconds and the required picture can be displayed on its own or as a Slide File 'polyphoto' (30 small pictures displayed at once).

The system allows searches to be carried out by title (or part title), by category (or categories), by keyword (keywords or part keywords) or, by a combination of those criteria. It is also possible to store the date of origin of a picture, dates of initial and most recent selection for broadcast, and a count of broadcast selections - all of which may be used to speed up searches. The Gallery system also offers administrative facilities including printouts of the stills selected for use on a particular programme, possible royalty payments, etc.

The central library system runs on a DEC micro-computer (PDP11/83) with a fixed Winchester 456 Mbyte memory for the database. Back-up copies of the data can be taken at regular intervals on a DEC 95Mbyte 'streaming tape' cartridge.

### The Stills Store

Permanent picture storage relies on optical discs, rather like 12 inch CDs in sturdy cases, which can store up to 1100

electronic stills on either side. The optical discs are described as 'WORM' - write once, read many - which means that the stored digital image can never be erased although it can be accessed as often as required. Thus the medium is extremely robust, with a quoted storage life of greater than 30 years.



*The Gallery 2000 workstation, displaying a 'polyphoto' and 'picture request form'.*

Discs can be exchanged manually or by an optional mechanical handler for up to twenty discs - known as a jukebox! At present, two disc drives are connected into the system but more could be added to increase its on-line capability.

### Links with other equipment

The new library system is connected to the existing graphics area (described in 'Eng Inf', Spring 87) by analogue and digital links.

RGB video connections between the Gallery Slide File and the main graphics matrix allow access from any graphic device, while direct digital links to the Quantel equipment are provided using the Digital Dump system. This is a video signal carrying digital data in the active picture area (similar to full-field teletext) and transfers one still in about 5 seconds.

All pictures are stored in the REC 601 digital format and parallel ports are available for the Slide File. It is likely that this will become the method of interfacing as more of these parallel ports become available on other equipment in the area.

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