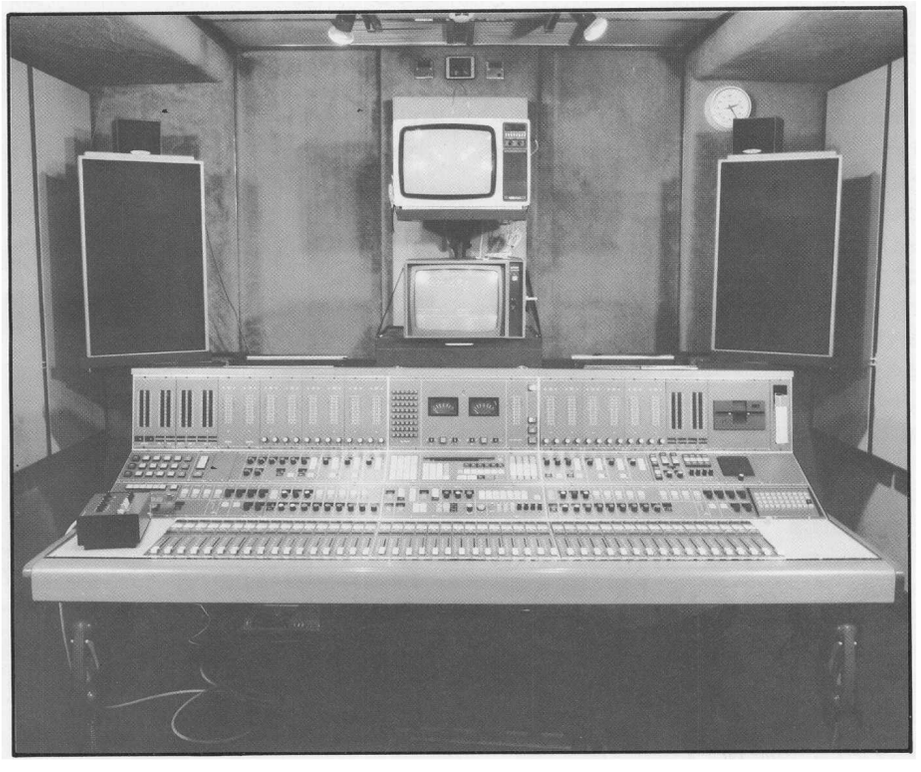
No. 22-Autumn 1985 **The Quarterly for BBC Engineering Staff** Please Circulate

New Digital Sound Mixing Desk



On the 16th September, BBC Radio took delivery of the all-digital sound mixing desk from Neve Electronics Ltd of Cambridge. Accepting the desk the Deputy Managing Director of Radio, Charles McLelland, said "The new desk is a major step towards the all-digital circuit from microphone to receiver. It offers greater flexibility than convent iona I ana logue desks, and wi II bri ng even better qua Ii ty to BBC Radio programmes". The following day, studio managers and other staff had the opportun i ty of i nspecting the installation.

The desk is the result of a collaborative agreement between Neve and the Engineering Research Dept, whose COPAS digital audio processor has been further developed by Neve to form the bas is of the new console.

The new desk has been fitted into a specially des i gned arti cu Ia ted trailer which has expanding sides to improve stereo listening conditions. The desk controls can be dismounted from the trailer and connected back to the centra ı processor v.ia 150m of fibre-optic cable. "This wi I1 enable the equipment to be used across a wi de-range of programmes" said Controller, Operations and Engineering, Russell Fletcher.

The desk is fully assignable and has been ergonomica I1y desi gned joi nt Iy by Neve and the BBC, after an extended period of trials with operational staff. A Iarge number of experimental features have been included in the design of the desk, ie. assignability, fibre optic communication, and digital processing, mixing and routing. The control surface, with a number of novel features, provides:-

Formats

Four formats are preprogrammed into the

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Editorial

Sharp-eyed readers will have not iced that the type-face and Iayout of this edition of "Eng Inf" is different. New technology has taken over, and a word processor is being used to typeset the copy in place of an old mechanical composer. AI though the word-processor speeds up the process of typesetting and layout, this is offset by the better justification properties and print qua Iity of the composer. Eventually the word-processor wi II be able to produce better copy than this, and I hope that you will bear with us until then.

Engineering Ties

I have just ordered a further batch of BBC Engineering ties in blue or maroon. Available in 6-8 weeks from 707, HWH, at £2.75 each.

An Apology

In the production of a magazi ne such as "Eng Inf", it is inevitable that we will make mistakes, and not give full credit where it is due. I m~st, therefore, apologise to the engineers who may have made a major contribution to a project, and yet see someone else getting the credit. The fault is not entirely ours though, since we are only as good as the person who contacts us wi th the story in the first place. If he or she neglects, or forgets, to mention the involvement of other staff on the project, then un Iess we bypass the contact, there is no way of knowing who else was involved. I can see but two solutions to this di lemma: one we omit all credit, but in the process upset everyone; or two - you make sure tha t you are the person to contact us wi th the story!

If you wish to take advantage of this offer, contact me on LBH 5432, or drop in to see me in room 707, Henry Wood House, my door is always open.

Alan Lafferty

BBC ENGINEERING SOCIETY

By Tony Berry, Chairman BBC Engineering Society

The BBC Engineering Society is a section of the BBC Club and aims, to quote from its constitution, "to meet the needs of those with an interest in engineering and scient ific matters by arranging lectures and visits and promoting soc ia I act iv ities" .

We do indeed set out to organise events which have a wide appeal and so our lectures for example, are not usually directed only towards engineers, but are very often of general interest even though they have some technical content. The programme of Iectures for the coming season wi II comprise the following:-

16 October 85 Aust in Rover-Robot Car Building
12 November 85 Television Audience Measurement
17 December 85 National Film Archives
21 January 86 CEEF AX
18 February 86 Communications-past, present and future
15 Apri I 86 Domesday Project.

Visits to organisations of technical/general interest are arranged at intervals throughout the year. In the past these have included: car manufacturers, breweries, museums, research institutions, Tower Bridge, National Theatre, a coal mine and even a farm. A number of visits are currently being planned, which we hope will include the Royal Naval Ordnance Museum at Southampton and London Ai rport.

Further details for all these activities wi II be publicised in due course, so keep an eye on Club noticeboards. Better still, join the society, so that you receive full information direct. The annual subscription is only one pound.

If you wou Id like further information, please contact the Hon. Treasurer, Robin Caine (211 Western house, BH 4627) or me (A2004 Woodlands, TC 3701).

Transmitters Opened

The following transmitters have opened/or changed since July:-

Uhf television	
Machen Upper	Gwent
Corr is	Powys
Llangybi	Dyfed
Bonchester Bridge	Borders
Tregaron	Dyfed
Fiunary	(Mu 11)
Norwich Central	Norfo Ik
Stamford	Li ncs
Bow Street	Dyfed
Vhf Radio	
Peterborough	Cambridge
Londonderry	
Brougher Mt	Fermanagh
Stranraer	W Galloway

Digital Desk
Continued from page 1

desk to enable standard types of desk to be selected immediately upon switch-on. It may be configured as two multi-track desks, an OB desk, or a studio desk. Further set-ups can be confi gured by usi ng the "assi gn" panel, then stored on the opera tor's own disc.

Total free grouping
Any fader can become a group master and there is no theoretical limit to the number of groups formed.

Mobil ity of faders
Faders, singly or in groups, can be "moved" about the desk. This means, for example, that a si xteen fader "band mi x" cou Id be set up on the central faders during the sound check. This cou Id t hen be moved to the ends of the desk, wh i Ist a "support band mix" could be done centrally. The main mix, previously set up, can then be reca lied to the central position, the channel selections unchanged.

Stereo channels
Channels can be confi gured for stereo wi th common control to both legs. The "assignable facilities unit" allows ftne i mba Iance to .be corrected, but all other functions are controlled in tandem. This can be overridden by the "split" button which gives each leg its own channel strip and leaves only the fader in stereo.

Source nam ing
Each channel input can be labelled electronically

Laci Nestor-Smith (left), MD of *Neve Electronics, presents* a *floppy disc to Charles McLelland DMDR,* as *part* of *the handover* of *the all-digital control desk;*

with the aid of a four-character 15-segment display. Thus any input, its associ ated fader, and any processi ng control modules assigned to it, all bear the same label which will "follow" the fader if it is moved.

CONSOLE SPEC IF ICAT ION

The desk is based on 16-bit digital-to-analogue and analogue-to-digital convertors, but at vari-0us points in the system the dynamic range capability varies. The input convers ion is to 16-b i t accuracy but is ranged manually (over an 18-bit range) by the use of a novel system whereby the channel fader a Iso con-t ro 1st h e i n put g a in. A limiter prevents the ana logue-to-di gi ta I convertor from being overloaded.

The main mixing bus processing is to 32-bit accuracy to allow sufficient headroom for summing and the effects of extreme boosts of equa 1-isation. This is truncated to 16-bits before the output stage.

A maximum of 128 mixed si gna Is can be formed. Unless active processing is required on the combined signal, mixes are not formed until the final output stage. Thus, 'virtual' groups are crea ted for group gain control.

VEH ICLE

The Digital Control Vehicle (DCV) is articulated with tractor and purpose built trailer. The trailer was developed by Studio Capital Projects and CMA Coach-buJ Iders Ltd, London.

The vehicle has three major areas:

Control Area
To give improved Iistening conditions the sides of the control area are expanded by hydraul ic rams. The volume of

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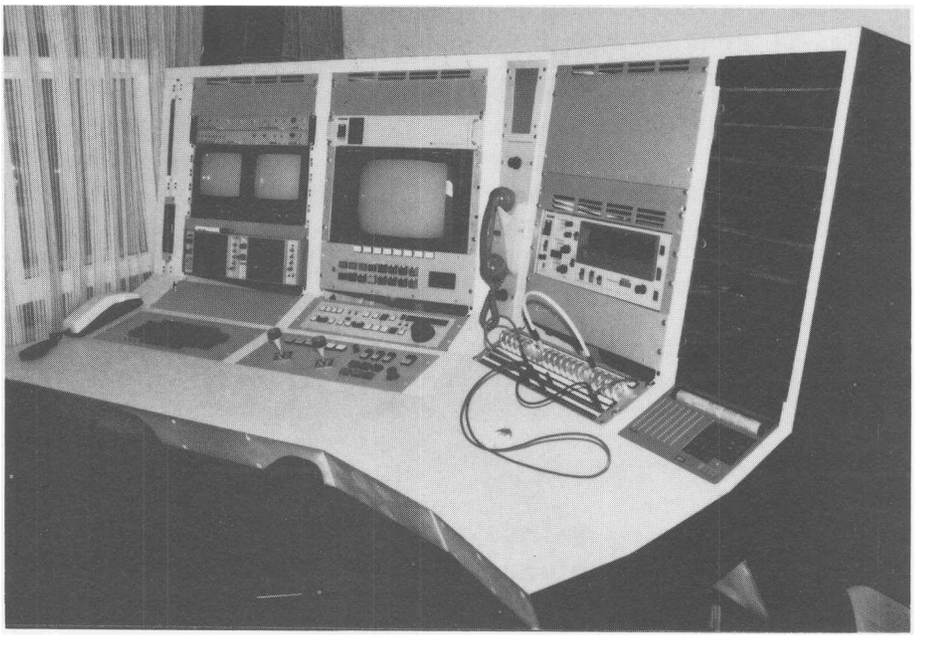
PSC Facilities at Pebble Mill

Li ghtwei ght television cameras, attached to U-Matic video-tape recorders, are increasingly being used in television productions. Known as Portable Single Cameras (PSCs) they came from the manufacturing houses of major names such as Ikegami, Philips, RCA and Sony. Future developments suggest that the cameras wi II use charge-coupled-devices (ccds) instead of 2/3 inch tubes, and component (RGB or YUV) signal recording. They will also have an in-built recorder and not suffer from the prob Iem of colour ba lance, sensitiv ty, and over-weight that are characteristics of the i r p re-decessors.



The PSC suite control desk at Pebble Mill

The transmission of inserts recorded on PSCs becomes a problem. Few areas are currently equipped for replay from U-Matic equipment in the same way that they operate tk or vtr transmissions. To overcome the problem the first of a pa Ir of sui tes, dedIcated to the transmission of 3/4 Inch hlgh- band U-Matic tapes, has recently gone Into servIce at Pebble Mi 11.

The PSC transmission and transfer suite Is somewhat Innovative both In concept and design, provl dlng fu 11 facil i ties for record or replay and extensive monitoring, within a very sma II area.

Following consultation wi th the user department and tk staff, the Engineering Services and Operat Ions staff at Pebble MI II were faced with squeezing a quart Into a pint pot. It was decided, following past experience, to produce a simple to use menu control system based on a BBC Microcomputer. Positioning of the menu selection buttons, and software optlmlsed for m In Ima I button-push Ing, means that operators rarely have to move thel r hands or eyes out of the operating area. The menu Information Is presented on the bottom ha If-l[1ch of the colour monitor, In the form of header-and-Iabels for the el ght selection buttons immediately below.

The header displays the function required of these "soft keys", and is selected by one of sixteen dedicated buttons associated with the control requirements of the system, eg. mon itor selections, timecode routing, etc.

The hardware, like the software, allows great flexibility of routing by using a thirty-two Input vision matrix, further enhanced by gaining access to the Videotape area record matrix, providing external record lines and monitoring of the areas tk and 1 inch mach ines.

All the electronic assemb lies are bu IIt on 3U eurocard format and are housed within the control desk. Interconnections between the control panels, subracks and distribution panel have been made using ribbon cable, even the 2U bantam audio jackfield was terminated Into eight 50-way ribbon cables. The audio routing Is also extensive and maintains the twin-track distribution provided by the rest of

The row *of eight white buttons under the monitor control various functions. They are annotated via BBC micro program, and displayed* at *the bottom of the monitor screen.*

the vt area.

The hard-ware and soft-ware were produced loca 11y by John Macavoy and lan Sykes.

Extensive use is now being made of PSC at Pebble Mill. Ninety-five percent of Midland Regional Television News coverage is now on. PSC using four camera teams in the East and West Midlands with PSC editing facilities at Pebble Mill and Nottingham.

Network Programmes like "Top Gear" and "Pebble Mi 1I a t One" now use substantial amounts of PSC Inserts In their programmes and the fullest possible use is being made of the single Network PSC editing and camera facilities at Pebble Mi 11.

The second of these PSC transmission suites is expected to be ready for the Autumn start of "Pebble Mill at One".

Digital Control Vehicle Continued from page 3

the control area in creases from 20 cub ic metres to 30 cub ic metres with the sides expanded.

The control area has acoustic treatment de-si gned by Research Department to provide optimum listening conditions. It houses the control surface, a pair of specially modified BBC LSS/a loudspeakers, a VDU for the Neve system, a rlgging/ production TV monitor and a pair of check loudspeakers.

Recording Area

Two Mitsubishl MXaO dig ita I stereo tape-recorders with Designs Department interfaces to transcode between the AES/EBU signal format, used by Neve, and the Mitsubishi recording form at. Provision has been made for two analogue stereo tape recorders and a digital multi-track machine.

Also in the Recording Area is an engineer's bay wi th audio and vi deo jackfield, distribution and cue amp Iifiers and engineering telephone system.

NICAM digital transmission equipment is housed to the rear of the area.

Equipment Area

Acoustica 1Iy isol ated from the main body of the vehicle, this area contains power control and distribution systems, signal processing racks, input/output stage boxes and cubicle facilities unit for the Neve digital mixing desk.

The power system is split into three separate inputs, each wi th comprehensive monitoring and control to cope with a maximum load of almost SOkW. The normal running load is of the order of 30kW, consisting of the demand from techn i-cal equipment, a cool ing system for the technical' equipment, and an air-conditioning system for the control and recording areas.

External

Provision has been made at the rear of the trailer for conventional and fibre-optic cable inputs. The cables are stowed in a cabinet at the side-rear.

The digital control vehicle outside the Radio OB base at Concord Road.