

# ENG INF

The Quarterly For BBC Engineering Staff

## Major BBC Showing at IBC

The BBC will take an important place at the International Broadcasting Convention in Brighton this year.

No less than seventeen conference papers will be read by BBC engineers and there is to be a major exhibition stand to show off more than a dozen novel engineering developments from Research and Designs Department.

All the products on show can be licensed for manufacturing by private industry or have already been licensed and need to be shown off to potential overseas customers. At the moment product licences draw in some £65,000 a year but we aim to increase that as much as possible.

The equipment on the stand will include novel equipment from Research Department for electronic preparation of Television Graphics and ACE (Advanced Conversion Equipment), the first four-field digital standards converter and the first to be virtually transparent in operation.

Other developments on show will include NICAM, the digital sound distribution system, high-quality Band II

FM transmitter equipment and compact, microprocessor-controlled equipment that will generate television logos and captions.

There will also be a demonstration of processing audio signals using a COPAS (Computer Processing of Audio Signals) system in which spectrum shaping, compression, limiting and other audio processes are all controlled by a bit-slice microprocessor working on digital signals.

Outside the exhibition hall will be CMCCR 2, the BBC's new Colour Mobile Central Control Room. It has sides that expand to 4th metres width, opening to give a spacious production unit that will handle 25 vision sources and includes a stack of 34 monitors.

## 405 Ends, Self-Help Begins

On May 20th, the Home Secretary announced the phased closure of the 405-line television service, authorisation for a further stage of relay station building and also signalled the start of a scheme for 'self-help transmitters'.

The closure of the 405-line transmitting stations will be spread over a period of five years between the beginning of 1982 and the end of 1986. The 39 BBC stations to be closed in 1982 are in areas where there is almost complete UHF coverage. The closure programme will be co-ordinated with the IBA so that transmitters in the same area will be closed at the same time. These are the key points from the announcement:

- Phase III, the next phase of UHF relay station building, will follow on after the present Phase II programme has been completed. With 200 Phase II stations still to be built at the rate of 70 stations a year, Phase III should begin during

1984. Service Planning Section at Research Department cannot yet anticipate the number of Phase III stations that will be required but feel it may be as many as 500. These will be built at the same rate of 70 a year.

- In the 'self-help' scheme, approval will be given to small remote communities to set up and run their own stations. Broadcasters will do the basic planning and will ensure that the transmitters are integrated into the network. Then when a station comes into operation the broadcasters will check that it is not causing interference to existing viewers in the area. When this has been done the Home Office will issue a licence for five years operation at a cost of around £100.

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## 'Our Standards Are Highest'

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" You may think it is strange that at a time when many things are being cut that we should initiate this engineering bulletin but for a very small cost every year it should be able to contribute considerably to keeping us all in touch with what is going on in BBC Engineering. Some of you may well be pleasantly surprised at the range of development that is going on in BBC Engineering now, today.

With technology developing as rapidly as it does today I am very proud to be able to boast that engineers in the BBC are not just following close behind the technological bandwagon but are amongst those who are in the front pulling it along.

But the cuts in our expenditure have been on all our minds over the last few months and the repercussions will continue to affect us for a long time. We have to give up 130 posts in the Engineering Division from a total staff of some 7,000. As well as the reduction in staff we are going to suffer much tighter budgetary control, but as engineers we are thoroughly used to the practice of tailoring our system to the budget that is available.



Bryce McCrerrick  
Director of Engineering

Despite these cuts in effort and money our technical standards will not fall. As broadcasting engineers we will continue to lead the field in Research and Development and our operational standards will likewise continue to set and example to broadcasters the world over.

Some of the equipment that has recently gone in service shows just how BBC engineers are setting even higher standards. The new digital standards converter at Television Centre has proved so efficient that some people ask whether programmes have in fact Continued on back page

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### Simple Self Help

Most of these stations are expected to use commercial yagi receiving and transmitting aerials and commercial amplifiers. The amplifiers will be similar to those being used at present for wired distribution systems. The power of each station will obviously depend on the area it has to serve but will have to be carefully planned to avoid interaction with other stations on the same or adjacent channels. Split receive/transmit sites may be necessary in some cases. Most of the stations should be active deflectors which receive and transmit on the same channel but some stations may need to use transposers in order to avoid possible interference.

So far there have been about 40 requests to operate 'self-help' stations mainly from remote communities in Scotland. So, it is difficult to assess how many 'self-help' stations will be put in service but estimates vary from 200 to 500 stations.

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A self-help system could be just as simple as this

#### 405-line Stations closing during 1982

Abergavenny	Cambridge	Hungerford	Okehampton
Aldeburgh	Campbeltown	Kendal	Oxford
Ayr	Canterbury	Kilkeel	Perth
Ballachulish	Cardigan	Kinlochleven	Port Ellen
Ballycastle	Cannarthen	Llanelli	Scarborough
Bedford	Church down Hill	Maddybenny More	Scilly Isles
Belmont	Dundee Law	Marlborough	Sheffield
Bexhill	Ffestiniog	Newhaven	Swindon
Bodmin	Girvan	Northampton	Ventnor
Bude	Hereford		

## Radio With Data As Well

Research Department is developing ways of sending extra, inaudible signals with radio broadcasts. Using these signals tuning could become automatic and the radio set of the future could have an electronic display indicating the name of the network, telling the time or giving the latest news headlines. There are two systems, one for VHF/FM and another for MF/LF radio. The MF/LF system is being pursued only by the BBC. It phase-modulates the radio carrier wave at 50 hertz using digital biphase modulation. The data rate is 25 bits per second and experimental transmissions have already been broadcast from Droitwich, Radio 4.

#### JOIN IN THE EXPERIMENT

Subcarrier tests are already underway at Wrotham and Research Department want volunteers who will listen critically to VHF at home or in their cars and report their comments.

The VHF/FM system is capable of supporting a data rate of 1200 bits per second using a biphase signalling rate of 2400 baud. The BBC has shown that these signals could be very effectively placed on a subcarrier of 57kHz. Test transmissions have been broadcast on Radio 4 and Radio London from Wrotham.

The VHF system can carry very much more data than the medium/long wave system and as well as international discussion on standards there will have to be considerable discussion with the receiver industry before the system could go into use.

Volunteers will have to complete a special form so if you can listen to Radio 4 from Wrotham and would like to join in the trials, telephone EID on BH 2921 for a form.

#### ABOUT 'ENG. INF'.

You can call it what you like but if you want to use our name you should pronounce it 'Enj. Inff'. We are aiming at the technical people in the BBC and we hope it will give a wider view of what is going on in BBC Engineering.

We would welcome your views on this first edition and we will welcome contributions from you for future editions. If you are too busy to put pen to paper, then just ring BH (London) 5432/5433 and let us know what you have been doing.

We will sort out the protocol of ensuring that any stories we print have been checked with the right people so you can feel free to pick up the telephone anytime you like. It may be that some of your achievements deserve much wider coverage in magazines outside the BBC. We can see to that too if the story and the time are right.

This edition was edited and prepared by David Allonby, Gwyn Morgan, Lynne Prop and Amanda Tucker.

## 'Digital TK Within Five Years' -Says Sanders

'We can expect to see all-digital telecine machines on the market within the next five years but all-digital cameras will have to wait for the nineties', says Richard Sanders of Research Department in an SMPTE Conference paper.

His team have already developed an all-digital telecine which produces 'an exceptionally clear and uniform picture'. The sensor is a 1024 element linear array which scans the film image sequentially at 24 or 25 frames per

second to produce a single 625-line or 525-line sequential output which then is digitally stored. The information in the field store is reordered and read out to provide conventional 625/50 or 525/60 interlaced video.

Dark areas of the picture must be coded to 11-bit sample accuracy. The team have devised a practical alternative to a full-bit ADC by providing a second 8-bit ADC with its signal pre-amplified by a factor of 8. The second ADC contributes three additional bits when-

ever the signal falls below 12.5% of peak white.

But broadcast quality digital cameras will have to wait. Richard Sanders says, 'lightweight camera heads using economical analogue LSI signal processing cannot be matched by digital circuits which need more space and consume a great deal more power. For example, to correct for element-to-element sensitivity variation in a sensor array would need a complete field-store for each sensor',

