

Report on IBC 82

By Joseph Roizen

IBC 82 will best be remembered for two confrontations: one technical, the other meteorological. On the TV technology side, two widely divergent approaches to the television of the future fought their first major skirmish in the beachfront hotels of Brighton (Fig. 1). Sony mounted its first European demonstration of their 1125-line, 60-field, high definition TV system in a suite of the Grand Hotel, across the street from IBC headquarters. At the Metropole, Philips, IBA, and the BBC each had impressive demonstrations of the potential enhancement of PAL signals, brought about by unique (and different) forms of video signal processing.

It was evident that the European TV broadcasters and equipment manufacturers are strongly resistant to a new television standard involving 1000+ lines and implied obsolescence of the current 625-line, CCIR systems. The Europeans were not jumping on the 1125- or 1249-line scanning systems (as CBS has done in the U.S.); instead the major research efforts are in the direction of squeezing the last

ounce of performance out of the existing color systems.

Delegates and exhibitors alike will also long remember their confrontation with the Brighton weather and its side effects on the IBC. For the first few days, an unseasonable heat wave and the accompanying high humidity drove temperatures, at many exhibits, to above the 100-degree mark and wilted both the visitors and the company representatives on the stands.

Despite these conditions, IBC 82 has to be considered as a success in several significant ways. The overall TV industry growth pattern, even in these hard economic times, set new records in exhibit space booked (11,000 sq. m.), in attending delegates (4,000+), in numbers of exhibitors (132), and in new products that competed in this highly active marketplace. In addition to the interior exhibit, the beach at Brighton in front of the Metropole, was lined with no fewer than 15 mobile TV vans of all sizes, interspersed with satellite dishes demonstrating instant linkups with far-away transponders (Fig. 2). The technical conference, always a highlight of IBC, was of excellent quality, and the topical lectures attracted large audiences. Each delegate received a useful document containing all of the details described "live" by the authors.

The SMPTE, one of the sponsoring organizations of the International Broadcasters Convention, September 18-21, 1982 in Brighton, England, had a booth where information was given and people could sign up for membership.

There were also some surprises on the new products side. IBC is often just a PAL rerun of the preceding NAB exhibit, but this time Ampex appeared with two VTRs that attracted a lot of attention — a super-deluxe VPR3 Type-C recorder, and a super-light VPR5 (Fig. 3) that was jointly developed with Nagra and renders real 1-in. portability to EFP operations. Ampex also joined VHS for a 1/2-in. ENG camera/recorder combination, while Thomson-CSF adopted the Betacam format in the same domain. Most of these "camcorders" are now working in PAL, except for the Bosch/Fernseh combination, which is operating in NTSC using the Funai CVC cassette.

The dominant VTR at the show was the 1-in. Type-C machine, with the professional U-Matics running second. But there was no shortage of Type-B recorders, and that format has many dedicated users in Europe and other 50-Hz areas. Editing systems

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Figure 1. General view of mobile van exhibits along the beach boardwalk at Brighton. Fifteen OB vans of all sizes were on display, including many satellite uplinks and TVROs to show that technology.

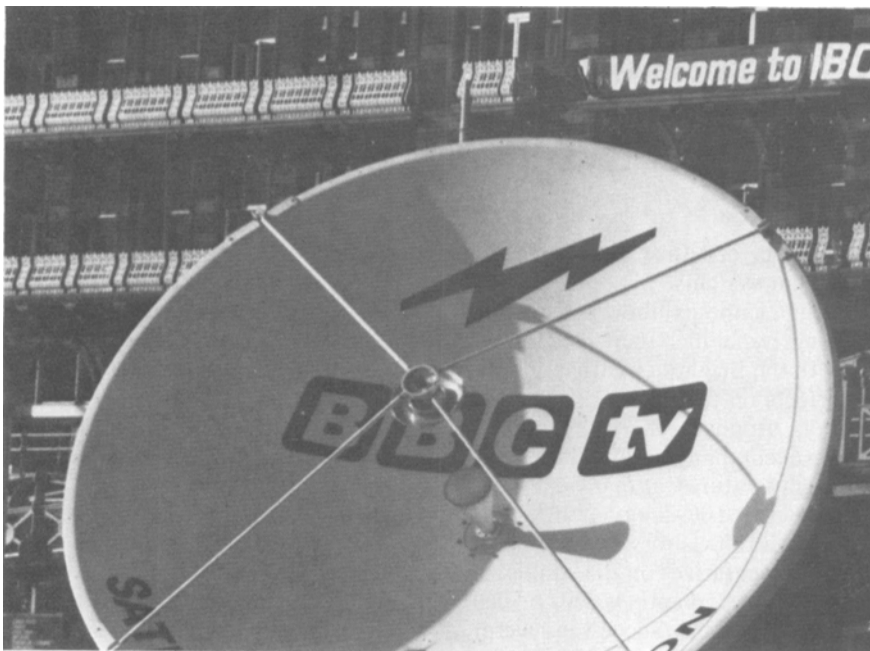


Figure 2. Satellites and DBS were major topics at IBC. Here is a BBC dish used to provide satellite images at the BBC stand at the Metropole Hotel.

abounded, and all of the well-known brand-names like the CMX340, the Mach One, Convergence, Datatron, etc., were being demonstrated in full operation. Telecines have now all gone digital with the entry of Rank Cintel into this field, and a glimpse of the fully automated studio of the future was available at the Vinten stand, where several remote-controlled color cameras moved, panned, zoomed, focused, and performed other functions without any operators in sight.

Digital special effects and computer graphics were also in evidence. Quantel's Mirage and the Ampex ADO were working in PAL, with incredible manipulations of superb video images. The aptly named Mirage could roll up a Coca Cola label into an open-ended tubular can format, with another image on the inside surface of the can, and then zoom it off the screen. This was such an impressive digital software feat that Charles Sandbank of the BBC used it in his opening lecture on new television technology. Video computer graphics at all levels were also available. The Quantel Paintbox and Logica's Flair system gave on-site performances with "electronic" graphic artists, while Aurora and Dubner displayed playback tapes of prepared materials showing the scope of their digital videographic equipment.

All of the color cameras produced good pictures. The heavyweights like the RCA TK47B, the Thomson-CSF 1525B, the Philips LDK6, the Bosch

KCP, and the Link 130 were there, but the interest this year seemed to be centered on intermediate-sized, median-priced cameras in the studio/EFM configurations. The competition at this level has become fierce, with at least ten manufacturers offering comparable products.

Across the street at the Grand Hotel was the Sony HDTV show, the Panasonic Recam demonstration, and several displays (Fig. 4). In addition there

were some overflow exhibits at the Bedford, a few blocks down the esplanade, where Scientific Atlanta, Rank Film, and others had their wares on display.

HDTV versus EP (Extended PAL)

No one could fault the superb video images shown by the Sony HDTV team that came to Brighton, headed by their veteran video pioneer, Masahiko (Morrie) Morizono, who is now Deputy President, and Stuart Samson, Marketing Director of their European operation. The HDTV demonstration consisted of a full complement of exclusively Sony gear (previous demos in the U.S. included other major Japanese manufacturers), which included 1125-line, 60-field cameras, VTRs, color monitors, a large-screen projector, and switching equipment. Live images as well as pre-recorded segments of specially produced programs were shown on the hour, every hour, to audiences in groups of fifty delegates, and everyone who saw it agreed that the results were comparable to 35-mm film projection quality (Fig. 5).

The equipment and technical specs of the system have been adequately described in the recent past, and Sony did not claim that this was the tacit HDTV standard of the future. They were demonstrating a capability of better video images for the consideration of the world's leading broadcast



Figure 3. New product hit of the show was the Ampex/Nagra VPR5, 1-in. Type C recorder weighing in at just 15 lb.

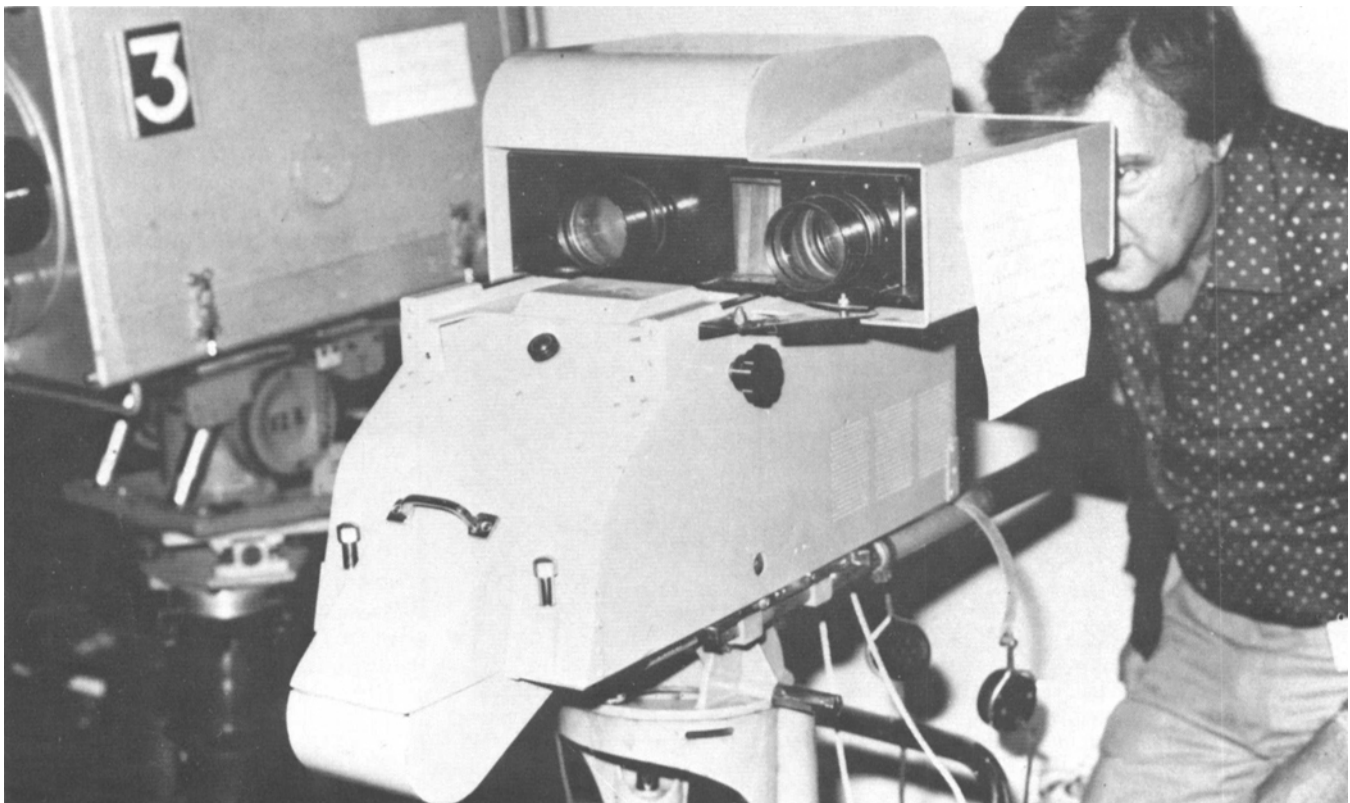


Figure 4. There was a little nostalgia at IBC in the Guild of Television Cameramen's exhibit of old cameras. Here is the granddaddy of them all, an Emitron BBC camera, circa 1937, used on the air in the U.K. two years before the first American TV program.

networks and prime program producers. The segments of a 20th Century Fox/Glen Larsen production of *The Fall Guy*, and a Francis Ford Coppola production specially made for CBS, were excellent examples of edited shows on HDTV. CBS also supplied some football and Rose Parade sequences to illustrate the use of HDTV for sports coverage. From a normal viewing distance, the 70-in., diagonal-screen video projection looked excellent and was without visible line structure. The high-quality stereo sound that accompanied some of the HDTV images also added to the "theater" effect of this demonstration (Fig. 6). However, the absence of some of the production techniques now commonplace on normal television (digital effects, chromakey, etc.) made the program material seem somewhat lacking in the full impact that HDTV may bring, when it too has all the capabilities of present NTSC, PAL, or SECAM systems.

To the major European broadcasters (and some in the U.S.), the ultimate picture quality of an 1125- or 1249-line TV system is not the key issue. The two largest problems they see, in the HDTV systems proposed by NHK, CBS, Sony, the University of Dortmund, or even Compact Video, are the initial high cost of the equip-

ment and the incompatibility of its video output. Adopting any of these systems means changing everything from picture origination to final display and, as yet, no one but the most ardent proponents, like NHK, CBS, and Sony, are ready to take the

plunge.

The European solution to HDTV is to find ways of getting the most out of PAL, by finding ways to make that 625-line, 50-field system look better through more modern TV technology. IBC 82 had three very well-presented



Figure 5. Sony HDTV was on display at the Grand Hotel next door to the Metropole. The full gamut of 1125-line, 60-field equipment was there to make pictures and show sample productions by Francis Ford Coppola and Glen Larsen.

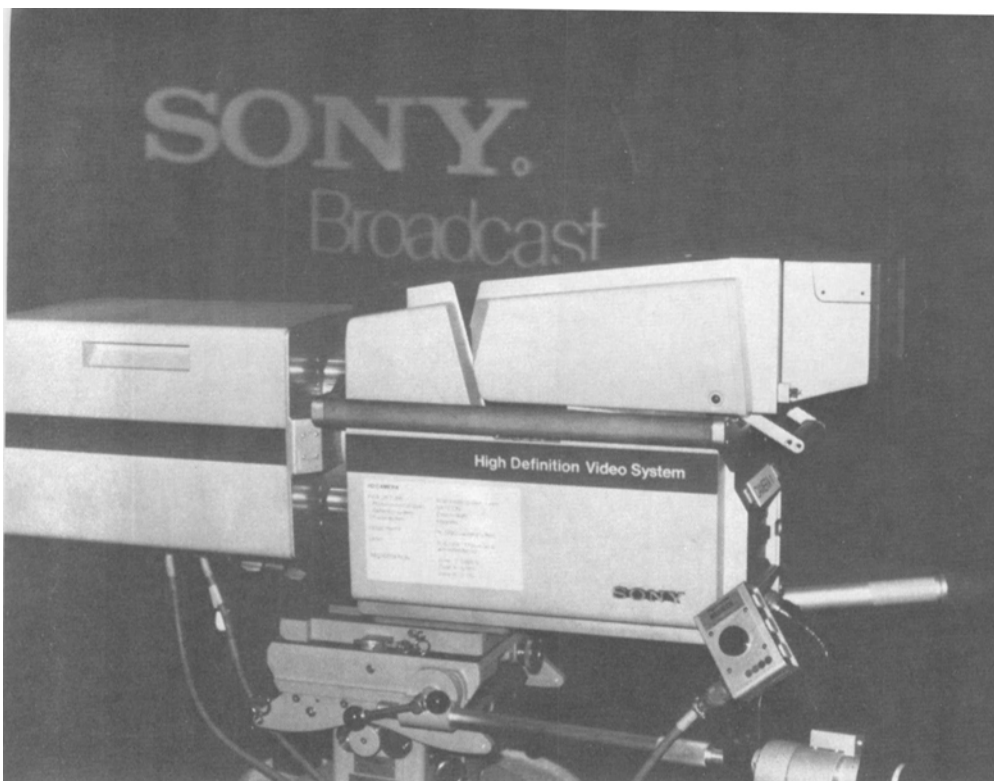


Figure 6. Sony HDTV three-tube camera is capable of producing superb color images with up to 30-MHz bandwidth. Demonstrations in Brighton impressed a steady stream of visitors.

demonstrations (put on by the BBC, the IBA, and Philips) reflecting the extensive research going on in this domain. Of these three, the Philips was perhaps the most impressive because it did not change anything in the transmission path to the home receiver, but depended upon signal processing in the domestic TV set to create the improved images. By contrast, both the IBA MAC system and the BBC's Extended PAL require wider spectrum space, and are aimed at DBS operations rather than existing TV services.

Philips' Hi Fi Zero

In a curtained booth near the registration area, Philips had set up two 25-in. PAL color monitors, one of which was standard, and the other with a higher resolution, shadow-mask tube and a 3-field frame store with recursive filtering and digital signal processing (Fig. 7). Groups of 15-20 people could watch the demonstration, which consisted of specially selected still-images, where the system works best, and a few moving sequences, where the defects begin to show up. The results were impressive, and the demonstrations put on by Philips engineers are, by their own admission, the first steps in a new direction whose outcome cannot easily be predicted. One roadblock is the need for a very low-cost frame buffer, another is the problem of motion detection and compensation in the digital

processing circuitry. Nevertheless, the impact of these improved images was not lost on the visitors to the Philips booth, including Donald Fink, the Chairman of the SMPTE HDTV Committee.

While the normal PAL receiver showed all the familiar defects of cross-color contamination (moiré), chroma noise, limited chroma resolution (due to the one-line delay line), and interlace flicker, the modified (HFZ) PAL receiver, getting the same signal, had a superb still image with sharp image detail, better signal-to-noise (S/N) characteristics, and no interline flicker. In addition, for American viewers who have trouble with the 50-field rate on European TV, the 100-field rate presented on the HFZ receiver gave a very flicker-free image. As the ultimate static test, a Zone Plate Generator test signal was totally unacceptable on the normal PAL set, while it came through with near-perfect concentricity on the HFZ monitor.

Image movement is the nemesis of this system, and some of the defects that begin to show up are proportional to the velocity of the movement. On the samples shown it was possible to detect some deterioration in image quality in such parameters as hue, saturation, S/N ratio and group delay, and, of course, in the cross-color area.

Philips is neither promoting nor

selling this approach, but obviously it is a counterweight to the HDTV proposals for higher line-rate systems. It extends the utility of the current PAL system, since existing sets continue to work as well as they ever did, while owners of the new sets will get better pictures. Best of all, the broadcaster does not have to do much to achieve this Extended PAL performance. There are light modulators to the PAL coder and, of course, good practices of picture origination.

The BBC/IBA Dichotomy

Robert Sarnoff once said, "Competition brings out the best in products and the worst in people," but this is hardly the case in this situation. The people involved, both in the IBA and BBC, are the nicest you would ever want to meet. Tom Robson, John Baldwin, Boris Townsend, and the rest of IBA's talented crew are about as affable a group as anyone could find. Bryce McCrerrick, Peter Rainger, and others of the BBC's top engineering talent are equally congenial, and both sides have contributed enormously to technical progress in the television field. Ironically, in the U.K., confronted by the same problem, these two leading pioneers in TV technology have come up with totally incompatible systems seemingly dedicated to the same purpose. The BBC's Extended PAL sticks with analog techniques and maintains reverse compatibility with existing PAL receivers; the IBA's MAC system switches to digital techniques and requires a special decoder in the receiver. Both systems are aimed at DBS operations, scheduled to start in the U.K. in 1985-86, and each proponent thinks his own system is the right technical and philosophical approach. How they could have ended up so far apart is a mystery to everyone on the outside.

The BBC position is that they obtain better images for DBS viewers without reducing the normal PAL receiver picture quality enough to affect the viewer. This is an immediately applicable technique imposing no added burden on the present viewing public. The IBA counters that this is a short-term solution, while their MAC system is the long-term answer to not only better quality PAL pictures but also 8-channel digital sound (Fig. 8). As an added bonus they point out that MAC is not standards-oriented and will work equally well for SECAM, thus making it a pan-European DBS system. In



Figure 7. Philips Hi Fi Zero PAL demo produced excellent pictures using a frame store in the PAL receiver to eliminate the usual defects found in such images. This closeup of the screen shows excellent high frequency luminance detail in striped shirt without the familiar cross-color moiré patterns.

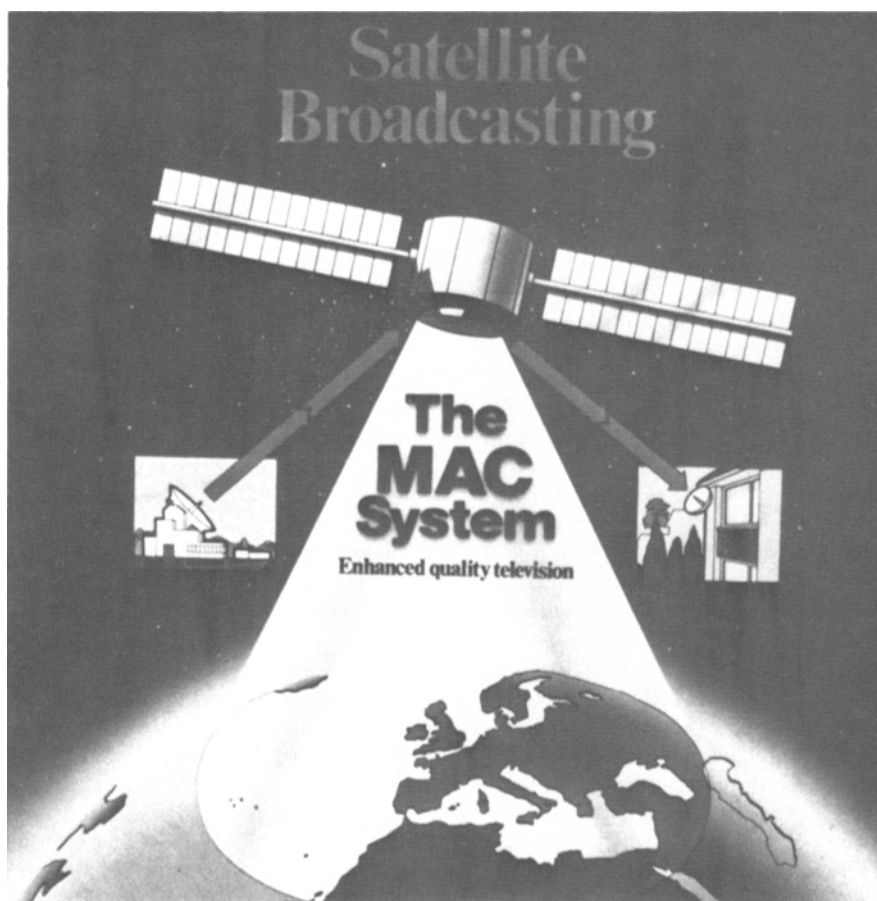


Figure 8. The IBA Multiplex Analog Component system attracted a lot of attention. It is a unique method of improving PAL for DBS applications, while adding 8 channels of digital sound.

fact, MAC has been proposed to the EBU for just such consideration.

Unlike the teletext dilemma of the early 70's, where CEEFAX and ORACLE started out with differing technical specs but were subsequently standardized through the efforts of BREMA, there seems to be no common ground for a single, compromise system between the BBC's Enhanced PAL and the IBA's MAC. Only time will tell if one or both survive as future DBS television systems.

Extended PAL (BBC)

Richard Sanders, the head of the research section at the BBC that developed E.P., gives a compelling argument for the validity of their technical achievement, in the process of explaining how Extended PAL really works. At the IBC stand, they had a fine-pitch, in-line, high definition monitor to provide an RGB image for input signal monitoring, a conventional PAL receiver, and an Extended PAL receiver. The difference in the E.P. receiver is that the luminance above 3.5 MHz, which was filtered off and remodulated on a twice subcarrier frequency (8.8 MHz), is now recovered and displayed. The result, which Sanders proudly displayed, is a PAL

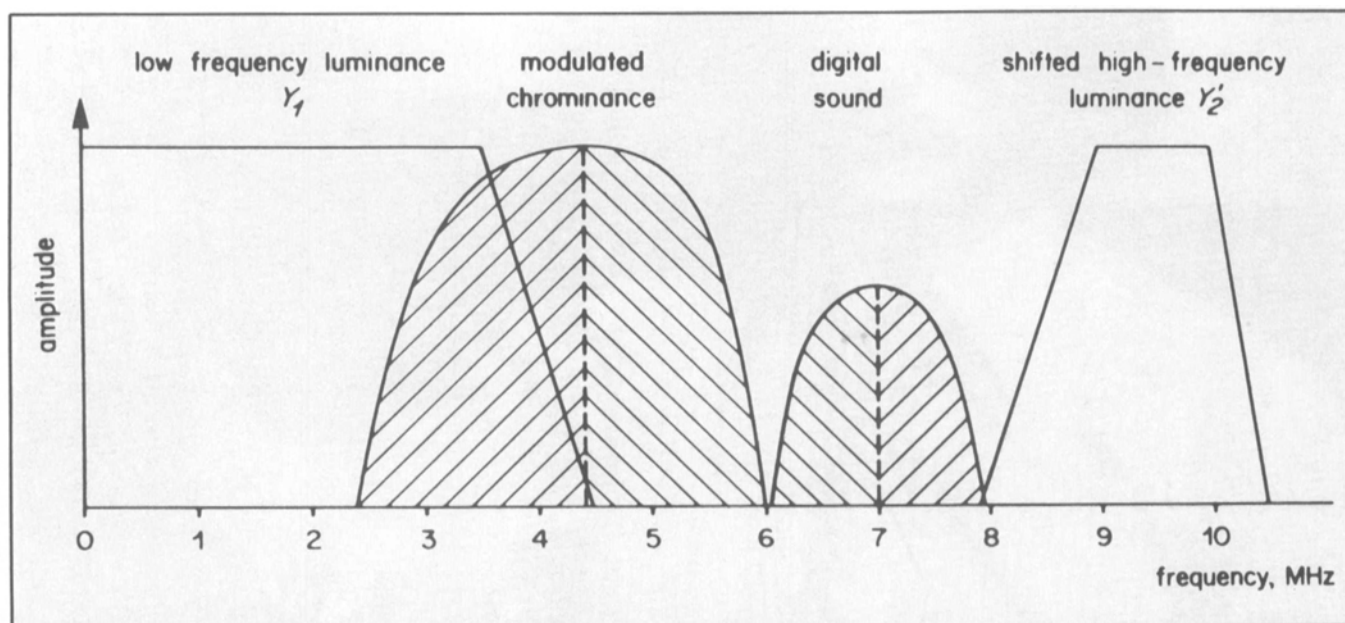


Figure 9. The spectrum of an Extended PAL signal. In Extended PAL the high-frequency luminance signal $Y/2$ is transmitted separately from the low-frequency luminance $Y/1$ and the chrominance by shifting it by the color subcarrier frequency. This leaves a gap in the spectrum which can be used for the transmission of a multi-channel digital sound signal.

image with substantially improved luminance detail and an absence of cross-color, which is quite noticeable on the E.P. set. The standard PAL receiver shows a slight loss of luminance resolution but, according to Sanders, this is a small price to pay for the improved moiré reduction, which he considers a far more annoying characteristic of conventional PAL sets.

What does E.P. do for the BBC's planned services on DBS? Besides providing better picture quality for DBS viewers, it also allows a digital sound spectrum that can handle up to six channels. Extended PAL was adequately described in lectures and documents available at IBC, but it will easily be grasped from the spectrum chart shown in Fig. 9.

In summary, Sanders emphasized that E.P. was a way of improving the resolution and reducing the cross-color in the allocated 27 MHz band on the DBS satellite channel, without destroying compatibility with existing PAL receivers. He also pointed out that E.P. and MAC could co-exist. However, the home receiver would need a separate MAC decoder to baseband, and could either remodulate on a UHF channel, or entered into the Y, U/V plug at the band of modern PAL receivers. With the BBC's E.P. system, only translation of the DBS signal to a UHF channel is necessary to obtain a normal image on the home PAL receiver. Obviously Sanders feels the BBC approach is the much more practical one.

Multiplexed Analog Component (MAC)

The IBA booth at IBC had a closed, darkened area in which both the MAC system and the enhanced PAL receiver were shown. MAC is a radical departure from normal PAL, in that the video signal is divided into luminance and chrominance components, digitized and compressed into sequential segments of the horizontal line time. Following a 4 μ sec sync word, the next 20 μ sec are color, and the following 40 μ sec are luminance. The MAC decoder in the PAL receiver restores the signal into a format usable by the video circuitry to display a superior image. In addition to the improved video performance, there are up to eight channels of digital audio available for multi-language or stereo sound needs.

Once the video signal has been digitized in the MAC format, it no longer has a PAL or SECAM identity, and it may be reconstructed by the decoder into one or the other, thus yielding a universal 625-line system for use all over Europe. MAC also has some other advantages: cross-color is reduced because of the separation of luminance and chrominance signals, and a high-definition option is available to produce images with greater resolution.

The demonstrations by IBA were also impressive — the MAC PAL receiver showed better pictures than those on the normal PAL monitor,

especially in the area of cross-color and resolution. John Baldwin of the IBA claimed that a standard MAC receiver could display 4.5 MHz of luminance and 1.3 MHz of color; however, with a frame store in the receiver and digital processing, it would be possible to extend this performance to 8 MHz of luminance and 2.3 MHz of chrominance. To back up this claim, a third monitor in the booth was used.

Baldwin explained that this monitor was equipped with a field store, and could produce 100 fields of display/sec, instead of the conventional 50. This eliminates the normal interlace effect on fine horizontal lines. Fine detail in a TV image will appear in one field to a much greater extent than in the other. This produces flicker between alternate fields. The IBA-modified receiver showed all 625 lines (both fields) simultaneously, thus the interline flicker is gone. However, Baldwin was quick to point out that the transmission path and the source signal were conventional PAL. The results on the modified-monitor screen were considerably better than the adjacent normal PAL set.

The IBA is making a strong effort to get MAC accepted by the EBU as a DBS standard at least in Europe. Tom Robson insists that this would greatly enhance program diffusion to both PAL and SECAM countries, as the satellite's radiated signal is nondominational, and can be watched in either color standard based on the decoder in the home TV set. 