P. G. PARKER, Chief Engineer

YORKSHIRE TELEVISION

THE FIRST ALL COLOUR TELEVISION CENTRE IN BRITAIN

INTRODUCTION

FROM THE MIDDLE of 1968 that part of Britain roughly east of the Pennine Hills, previously in the Granada service area, will become the responsibility of the new programme contractor, Yorkshire Television. With full colour television scheduled by the I.T.A to begin in 1969/70 Yorkshire Television decided to plan for colour from the onset, to begin operations in monochrome with colour equipment, to install immediately full facilities for the change over to colour, and to stock-pile programmes with the aid of colour mobile units.

Yorkshire Television are now nearing the completion of the construction and installation of a new Television Studio Centre in Leeds. This in itself, may not appear to be particularly noteworthy but it is worth while to consider some of the facts behind this statement.

In February 1967 The Independent Television Authority invited applications for new programme contracts and in the spring of 1967 the successful applicant for the Yorkshire area formed a new company, Yorkshire Television Limited, who are scheduled to go 'on air' on 29th July, 1968—some fifteen months from the date the company was created. The licence was granted on 15th June, 1967, and detailed planning began immediately followed by construction of the studios from 13th August, 1967, and the installation of equipment on 5th March, 1968, onwards. It is planned that the centre will be fully operational in colour by the autumn of 1969 using the PAL Colour System.

STUDIO PLANNING

At least two studios, videotape recording and telecine machines, presentation and master control have to be completed and made fully operational before the end of July 1968. Being the first all-colour studio centre in the United Kingdom presents its own set of problems—who, for example, has all the necessary expertise to advise on solutions to these problems? It

Fig. 1. General view from the Sound Control desk into the Production area.

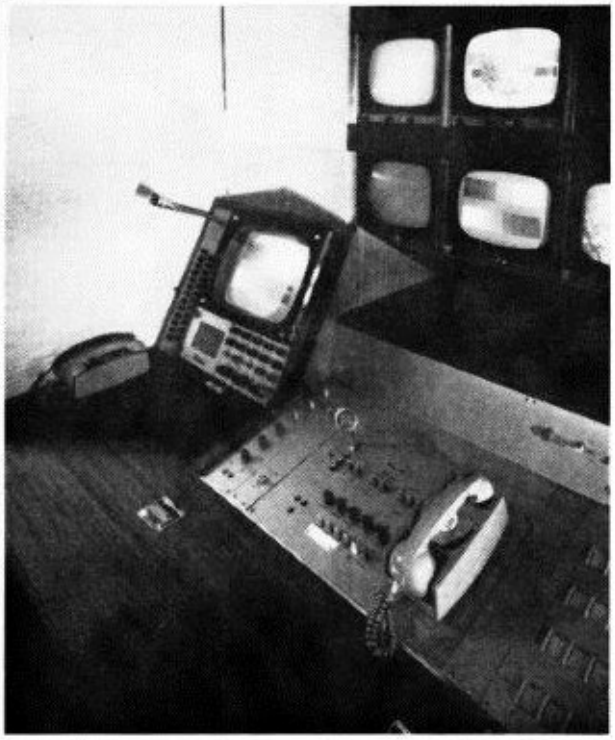

Fig. 2. The Producer's position on the Production desk.

Fig. 3. General view of the Sound Control desk.

was quickly realized that there is a large amount of experience and talent right on our own doorsteps—with the capital equipment manufacturer.

Yorkshire Television placed orders with The Marconi Company for Mark VII colour camera channels, telecine equipment and outside broadcast units worth nearly £650,000 to provide the initial programme origination equipment. The studio centre will contain a four-camera studio, a three-camera studio and a remotely controlled presentation studio, with a single Mark VII camera. The high stability of the camera will be particularly important in this latter application.

Eight of the sixteen Mark VII cameras ordered will be in the two four-camera colour outside broadcast units which have been specially built for Yorkshire Television.

In a studio centre it is essential to centralize equipments and to assign all audio, video, communication and the appropriate controls to the relevant area. These are very necessary prerequisites for consistent operation. Especially so with colour because of the greatly increased capital cost of equipment and the need to minimize the number of positions which can effect the colour balance.

The design of the studio centre and its systems posed many problems and involved a great deal of planning work which had to be completed very quickly.

An additional complication was the need for early delivery of O.B vehicles in order to stock-pile programmes and provide a means of training staff before the 'on air' date. The first vehicle was in fact required and delivered at the beginning of March 1968.

It was obviously desirable to choose a manufacturer who could undertake, with the minimum of supervision, the design, construction and equipment installation of units which would meet the operational requirements and philosophies of Yorkshire Television. This would relieve the planning staff of a considerable headache.

The Marconi Company were selected for this task because of their considerable experience of mobile design and application and because units currently under construction were sufficiently in tune to be readily adaptable.

Published articles by Marconi staff in recent years showed that their approach to the problems involved was similar to my own. For example, production staff should be provided with an area which would allow them to work in an environment uncluttered by

technical operations requirements and free from disturbing, and irrelevant for their purposes, talkback. Picture matching and sound also need separate areas if their contribution is to be optimized.

To provide a fully equipped O.B unit to achieve this separation in a practical manner is difficult, but the Marconi designed vehicle with an 8-ft × 11-ft × 32-ft box provided a very acceptable approach to the ideal requirements. Separate areas are provided for the four major functions of Production Control, Sound Control, Vision Control and Equipment area.

A detailed description of the vehicle is probably superfluous but the photographs show that the design postulations have been achieved in practical terms.

As previously explained, the main objective was the splitting of the Production and Technical areas of activity. The very spacious Production area—viewed from Sound Control is shown in Fig. 1. Vision mixer (A–B (Effects), C–D (Mix), Cut and Production P/V facilities), talkback facilities for Production and Senior Engineer, a high-quality picture and waveform monitor are all contained in the Production desk. In addition, the Senior Engineer has a 25-way preview selector panel (controlling one of four uniselectors). Thus the Senior Engineer has very comprehensive monitoring facilities readily at hand.

Production monitors are grouped into two rows—the first row of six monochrome monitors display two remote and four camera sources—the upper row includes two colour monitors (Transmission and Production P/V) with a monochrome monitor on either side displaying the compatible transmission and P/V signals. The left-hand monitor displays 'Off Air'.

The two-colour/nine-monochrome monitor arrangement in Production Control (Fig. 2) may well raise a few interesting questions—for example, why not reverse the number and have two monochrome and nine colour monitors. I regard the present state of the art to be such that it would be wrong to embark on an experiment simply to prove the long-term stability of colour monitors. Furthermore, there are still other problems yet to be solved—colour phosphors from one tube to another cannot yet be matched 100%. We are out to produce the most sophisticated programmes in the shortest possible time and to minimize the problems of achieving this aim. Until it has been proved beyond all reasonable doubts that the majority of monitors should be colour then we will continue with convention.

Fig. 3 illustrates the Sound Control desk—two Marconi 12-channel Sound Mixers plus echo/foldback control panels are shown fitted to the desk. Fig. 4 shows the readily accessible patch panel, audio amplifiers and tape deck. Both the Sound Engineer and his assistant can sit quite comfortably at this desk and still have an excellent view of all monitors in the Production area. To ensure that picture monitoring facilities are available in this area a separate 25-way selector panel is fitted.

The rear half of the vehicle is of particular interest. I have already mentioned my personal views on the ideal studio equipment/operational area philosophy. The Vision Control and Equipment areas of this vehicle design meet these requirements.

Fig. 5 illustrates the Vision Control desk which is situated between Sound Control and the equipment racks. This is regarded as being the ideal position as the engineer can keep in close contact with production on his left hand and simultaneously have immediate access as necessary to the equipment installed in six racks at the rear of the vehicle.

The Vision Control desk is suitable for a Vision Engineer and a Lighting Director—the exact complement of staff being dependent on the particular production. Grouped directly in front of the desk are two

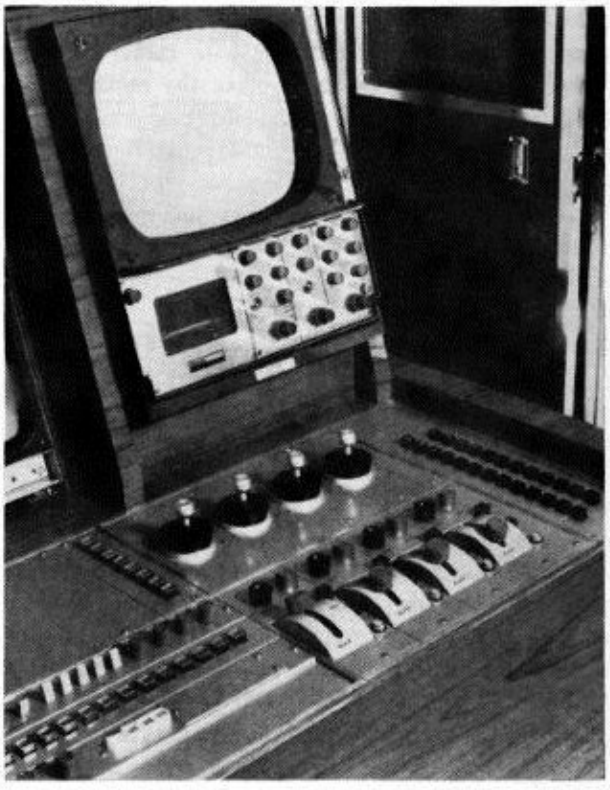

Fig. 4. Vision Control desk.

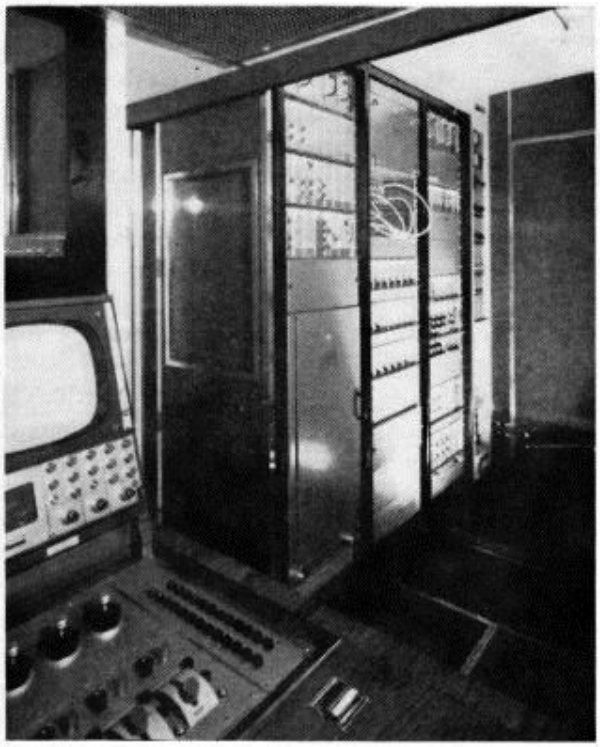

Fig. 5. Offside racks at rear of vehicle.

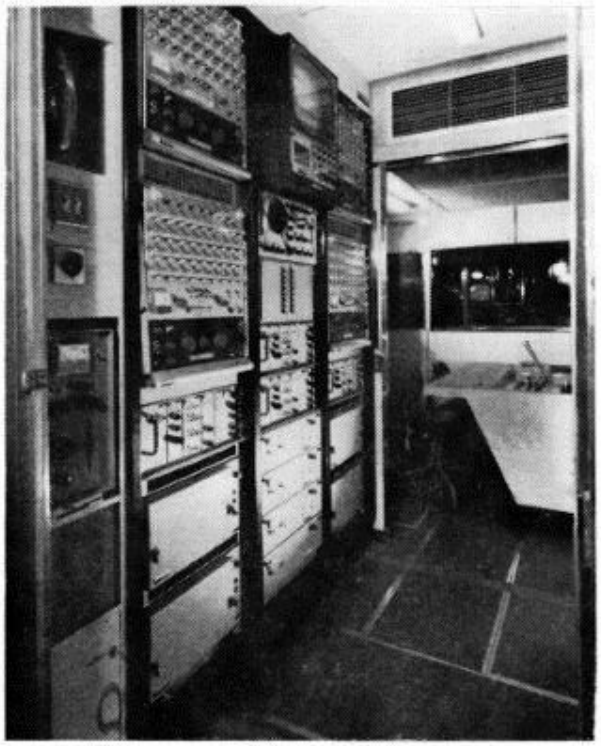

Fig. 6. Nearside racks showing Camera Control Units.

colour monitors, six monochrome monitors and a picture and waveform monitor with camera signals permanently monitored on four of the monochrome monitors. Full monitoring facilities are provided on the remaining monitors — the left-hand colour monitor being primarily the preview monitor and the right-hand monitor normally used during picture matching.

Control panels are grouped mainly into six equal-sized modules (Fig. 6). At present about 40% of the space is left blank — particularly to the left-hand side. This is the Lighting Director's position and the blank panel adjacent to the telephone handset is removable and can be replaced by a lighting dimmer remote control panel. The two centre and two right-hand modules are also of particular interest. Each module can accommodate four camera operational control panels or colour balance control panels. At the present time it has been arranged for the four sets of control panels to be in line — for example, the colour balance control for camera 1 is immediately behind the camera's operational control panel. Experience in the future may indicate that it would be more operationally satisfactory to group all eight panels in line from left to right — colour balance 1, operational control panel 1, colour balance 2, etc. This can readily be achieved by interchanging panels in the four desk modules concerned. All cables to these panels are of sufficient length to enable virtually any combination to be chosen.

COLOUR BALANCE

In studio operation of colour cameras it is usual, for optimum results, to adjust the channel gains by the use of grey-scale reflectance charts. The camera is adjusted so that the same signal level is produced by each channel throughout the grey scale. In outside broadcasts the use of the reflectance chart is also invaluable since it can be used for readjustments that may become necessary if the colour temperature varies during the transmission period. With very stable cameras, readjustments for the intermediate steps of the grey scale will not be necessary if the gamma correctors have been correctly adjusted.

On occasions it becomes necessary to readjust slightly the relative gains of the colour channels when, for instance, coloured light is reflected on to the scene by nearby coloured surfaces, a situation which could well exist at a horse racing O.B. The simple arrangement of separate controls of gain for red, green and

blue channels is inconvenient due to the necessity to operate all three simultaneously. To overcome this Marconi have designed a combined colour balance control so that by moving a single knob from a central position outwards, the gain of one channel can be reduced and simultaneously the gains of the other two channels increased.

The camera operational control panels incorporate only those controls which need be adjusted during transmission in order to achieve the required artistic effect. The main camera control panel forms part of the Camera Control Unit and is rack mounted (Figs. 6 and 7). In this arrangement the setting up of the camera channels is carried out at the main camera control panel. When this procedure is completed, control of the camera is switched to the smaller operational control panel in the Vision Control desk.

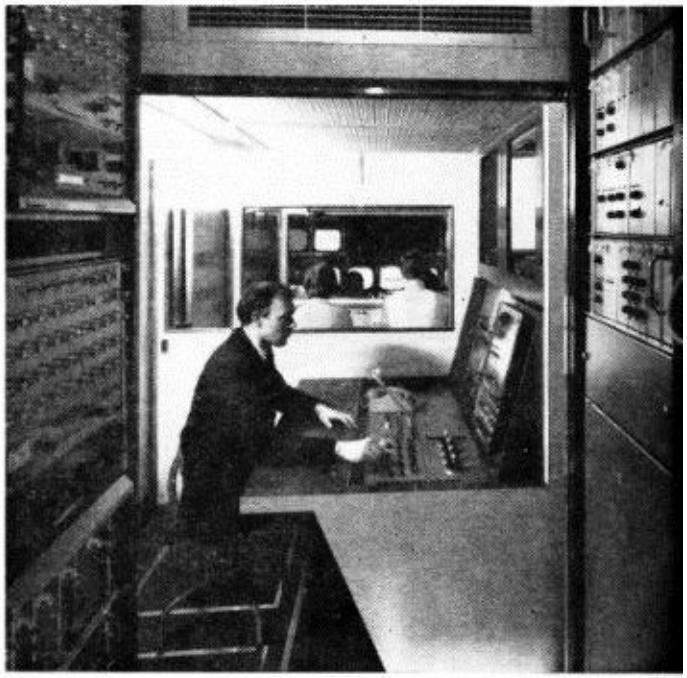

Fig. 7. Through view from rear of vehicle.