

# Communication Systems

Number 7

Marconi

## Marconi Launch New Telecine

The introduction of a new digital telecine by Marconi Communication Systems heralds another momentous step forward in broadcasting studio equipment. This new product, the B3410, stems from a long line of successful telecine equipments produced by Marconi and is an advanced design using solid-state charge-coupled device (CCD) image sensors.

Operating on PAL, NTSC or SECAM standards, or with RGB or digital output, the telecine combines the best of both worlds. Tailored specifically to the needs of the broadcaster, the B3410 Telecine generates high quality pictures, is easy to operate and attains high performance with the inherent reliability and stability of digital circuitry.

To complement and exploit fully the excellent characteristics of the line sensor, virtually all the video signal processing is carried out digitally, and to

ensure accuracy the three video signals use 11-bit sampling before gamma. The use of digital circuitry ensures precisely defined drift-free operation.

A microprocessor control system is used to set up gamma correction, matrix correction, aperture correction and other basic parameters and also supports the automatics. It monitors continuously the control panel information, film transport and automatic controls, and routes the appropriate commands to the video chain and projector light control servos. Built into the system is a resident monitor programme permitting rapid checks with diagnostic aids.

Film movement through the telecine is by a new Marconi-designed quiet-running continuous motion transport which handles film smoothly and gently, eliminating sprocket drives.

The B3410 Telecine — television film scanning equipment —

uses solid-state CCD imaging sensors in place of the electronic tubes of conventional designs, to achieve superior performance and reliability. A second innovation is in the video signal processing, which is substantially all digital, supported by microprocessor control, and a significant advance in precision, stability and freedom from adjustment and maintenance.

The B3410 has all the features essential to professional telecine operation. It will accept both 16mm and 35mm film, handle positive and negative colour film as well as black and white, and provide various forward and reverse running speeds. Optional automatic control of picture quality, monitoring signal levels and colour balance, is available, and the telecine operates on the 525-line, 60 field/s and 625-line, 50 field/s television systems, and on NTSC, PAL and SECAM colour standards. Both optical and magnetic sound tracks are accommodated. A film frame counter is provided, and amongst further options is a be selected as start points, to which the telecine will automatically run at high speed and stop, ready to go on air.

Conventional telecines use tubes, having a limited life, either a set of three camera tubes or a special cathode ray tube plus three photomultiplier tubes.

The new telecine, having no tubes, eliminates the need for regular tube replacements, and the routine adjustments associated with tube scanning and focussing. The elimination of tube scanning alone removes a major cause of poor stability and reliability.



The B3410 Telecine.

### CCD Image Sensors

The three image sensors used in the new telecine are microcircuits, silicon charge-coupled devices (CCDs), each consisting of a series of cells. The charges proportional to the light received accumulate in the elements during each television line and pass from the device via shift registers forming the output picture signal. The precise, digitally-controlled action of the shift registers provides horizontal scanning of the film image, while the continuous motion of the film past the sensors provides vertical scanning.

### Digital Video Processing

After minimal analogue interfacing the outputs of the three sensors, representing the green, red and blue images, is converted to an 11-bit digital signal.

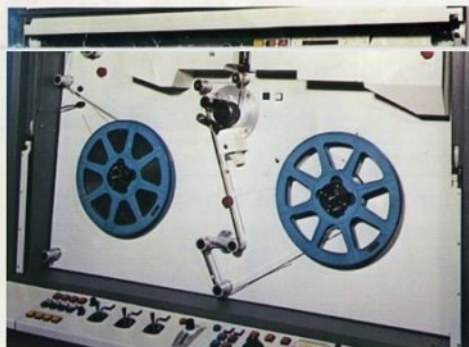
Here 11 bits/sample assure the necessary amplitude resolution for gamma correction, after which the signals have the standard 8 bits/sample. All the electronic signal processes necessary digitally.

An interesting feature of the video processing is an automatic "de-patterning" system, giving the picture a particularly clean and uniform background. Operating each time power is applied, or by push button, and with no film in the gate, the system detects any fixed background pattern resulting from small sensitivity variations in the sensor arrays, from dust particles on optical surfaces or slight illumination non-uniformity. The data representing the pattern is stored in a memory and corrects the video signal continually so as to eliminate the pattern from the picture.

The microprocessor system continuously monitors the control positions selected by the operator, the film transport and automatic control systems and routes appropriate commands to the digital video processing circuits and the film projector light control system. A resident monitor program permits rapid system checks with diagnostic aids, and the system as a whole provides flexibility for future developments.

### Film Transport

Powerful, direct drive motors are used for the film transport capstan and the feed and take-up spools. Automatic film tension control ensures gentle film handling at all speeds, including starting. The telecine has the rapid start capability essential in broadcast operation, reaching normal speed and producing picture and sound within 1/10th second.



Continuous motion transport mechanism.

## PULSAM A New Concept in Low-Loss Modulation

Broadcast transmitter technology has been given a major boost with the introduction, by Marconi Communication Systems, of PULSAM. By combining the advantages of pulse width modulation with those of the Class B modulation system Marconi has, in effect, created in PULSAM a low-loss modulator.

The cost of the power needed to operate just one typical current generation 250kW short-wave broadcast transmitter is likely to be well in excess of £100,000 per year. Yet the efficiency of these transmitters is such that some 50% of the power required is wasted before it leaves the transmitter as a generated signal. Thus the need to improve the efficiency of transmitters, and thereby to reduce operating costs, absorbs a considerable amount of the effort involved in advancing

transmitter technology.

Marconi has taken a radical approach to the problem. Instead of using a series pulse width modulation technique, Marconi has developed PULSAM so that the modulator only processes the audio power required to modulate the transmitter. The result is a dramatic improvement in efficiency over a Class B modulator, and a considerable improvement in the overall efficiency of the transmitter. This, in turn, makes for marked reductions in operating cost.

The British Broadcasting Corporation have already placed an order for four 500kW h.f. transmitters, Type B6127, based on PULSAM, from Marconi. These transmitters, which will greatly enhance the BBC's Overseas Service capability, are to become operational during 1983.



A B6127 transmitter under test at the Chelmsford development laboratories.



## Mark IX B Colour Camera

Some three years ago, Marconi introduced the latest in a long line of television cameras — the Mark IX fully automatic colour camera. The Mark IX has now sold in large numbers throughout the world but, in line with the progress made by the company in advanced camera technology, Marconi is now able to offer its latest variant — the Mark IX B.

A major new feature of the Mark IX B is an all-electronic solid-state system using a micro-processor dedicated to the control of the automatic sequence of each camera channel. The system of dedicated control offers a great deal more flexibility to the operator, as well as improved reliability, without the requirement for a central computer. It also allows cameras to be used in 'stand alone' situations, using a synchronizing pulse generator, without loss of facilities. This is a major feature of the Mark IX B and represents a considerable technological advance in this field.

A major advantage over most other colour cameras is the inclusion of a built-in diascope test pattern. This enables the automatic controls to carry out camera line-up without the use of external charts.

Several other innovations have been introduced in the Mark IX B, for example, the motor-driven potentiometers used in the original Mark IX have been replaced by solid-state digital/analogue converters. A further feature is the provision, as an option, of Automatic Beam Focusing (ABR) as an alternative to HOP for the control of scene highlights to avoid 'comet-tail' effect. ABR is a recent technique based on the use of standard camera tubes instead of special HOP tubes, thus offering an economical alternative.

### The Mark IX B System

The Mark IX B family of cameras has been designed to suit a variety of operational requirements — studio, outside broadcast or portable, for mains or battery



Mark IX B studio camera head.

operation, using standard multi-core or triax cable. The cameras are lighter and cheaper to run than their contemporaries and when fitted with triax cables they will produce excellent pictures at over 5,000 feet (1500 metres) away from the control unit. They have been designed to an exacting specification, major features of which are optimum sensitivity, minimum power consumption, minimum size and weight, full facilities, automatic or manual operation and low cost.

A small camera control unit of modular construction is used for all versions. It contains all the video processing modules, including the colour coder and switched mode power supply. This power supply contributes to the small size of the control unit and also to the efficiency, the power consumption being drastically reduced. The small control unit enables the portable version to be used in a variety of operational situations and the low power consumption permits operation for several hours on two standard car batteries.

The cameras can accept a wide variety of lenses designed for the standard pick-up tube formats. A variety of lens attachments, such as ray shields, close-up adaptors and range extenders are available for most lenses.

### Studio Camera

The studio camera retains the superior sensitivity owed to the unique and compact optical assembly used in the basic Mark IX and indeed in its predecessor, the Mark VIII. Monitoring facilities are available at the viewfinder making it possible to perform major registration adjustments at the camera head.

### Portable Camera

The use of lightweight materials and state-of-the-art technology has enabled the production of a camera of minimum size and weight, which requires no backpack and yet has all the facilities required by present day operators. Picture quality is designed to be comparable with that of studio cameras to permit inter-cutting of location shots without noticeable degradation. The camera can be used either hand-held or tripod mounted, on location or in the studio.

A choice of viewfinders is available all of which give a clear crisp display. The Mark IX B is fitted with a 180mm viewfinder. For portable use a 75mm binocular unit is fitted and a 25mm monocular is offered as an alternative.

A 180mm viewfinder can also be fitted to the portable camera when it is required to be used in a studio.

## New range of u.h.f. television transmitters

A new range of compact u.h.f. television transmitters are now being assembled at the Marconi Communication Systems factory at Chelmsford. Built to a new design the range has complete flexibility from a combined 4kW vision and sound single klystron transmitter to separate vision and sound transmitters at 10kW and above.

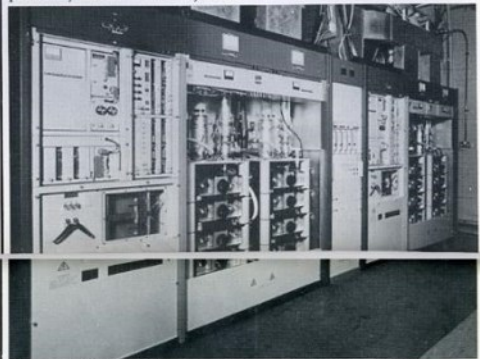
The first fifty to leave the production line have been ordered by the UK Independent Broadcast Authority to carry the fourth UK television channel, which becomes nationally available in late 1982. The first system, a 30kW comprising two identical 15kW transmitters working in parallel, has already been presented to the IBA for acceptance.

The transmitters are among the first in the world to employ a new range of klystrons and circuit assemblies of unusually small dimensions. These also provide an operational efficiency considerably in excess of that previously associated with klystron

transmitters and additionally simplifies spares holding by utilizing one version to cover the entire u.h.f. band.

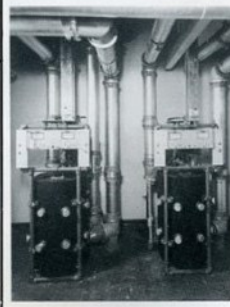
All equipments are provided with 'Rotamode' filters which act as either vision or sound combining units or as suppressors of out-of-band intermodulation products. The 'Rotamode' embodies the technique which has revolutionised transmission line filters in the last ten years, simplifying construction and in most cases achieving a considerable reduction in size.

All Marconi television transmitters are designed for completely unattended operation, having excellent stability of performance characteristics and providing an adequate number of remote indications. On/off controls are easily remotely actuated as are r.f. level controls and sound deviation. For equipment in active or passive reserve the system controls and indications can also be remotely.



Two paralleled 15kW u.h.f. television transmitters B7445 undergoing test.

## More Rotamode Filters for the IBA



Not only will "Rotamode" filters be used with the individual transmitters as mentioned elsewhere but a contract was also placed by the IBA for 47 channel combiners. For this the "Rotamode" effects an especially noticeable reduction in mechanical complexity and provides a compact, simple installation. They will be used to integrate the Fourth Channel equipment with existing IBA and BBC transmitters on stations planned from the outset to carry four programmes.

Rotamode channel filters at IBA Crystal Palace, London.

mechanical fittings no longer required for the colour system.

- (ii) Repositioning of the remaining equipments to conform with the new system design and modification of control desks, equipment housings, lockers, monitor fascia and termination panels ready to accept the new equipments.
- (iii) Fitting of new equipments, controls and panels, recabling and system timing followed by commissioning.

At this stage the vehicle is fully converted for colour operation and ready for use, however, as a finishing touch, the contract includes the supply of sealants

and cellulose paints to allow the vehicle to be resprayed, including striped waistband and sign-writing, so as to match the Federations colour outside broadcast vehicle fleet.

Colour conversions of this nature are not a new subject to Marconi. In the past many projects have been successfully completed in both studio and outside broadcast environments for the conversion from monochrome to colour operation. Each undertaking requires a detailed study of the existing and the proposed systems in order to minimise costs or wastage and to eliminate errors or delay at the installation stage.

## Egyptian OB Vehicle Conversion



Mk IX portable camera.

A contract has been signed between the Egyptian Broadcasting and Television Federation and Marconi Communication Systems for the conversion to colour operation of a monochrome outside broadcast vehicle supplied by Marconi to Egypt in 1972.

The vehicle is to be upgraded by the inclusion of four Mark IX Convertible Cameras, an eight input type B3730 vision mixer system, new communication and commentator facilities, plus modern distribution, monitoring and pulse generating equipment and additional accessories in-

cluding items such as termination panels, cabling and mountings. These will allow the new equipments to be fully integrated to bring the vehicle into front-line operation with the Broadcasting and Television Federation's fleet of colour outside broadcast vehicles.

The vehicle's original equipment complement included the Mark VI photoconductive monochrome camera, designed for use with vidicon or lead oxide tubes, this was the last range of monochrome cameras to be manufactured by Marconi before the introduction of the world beating ranges of colour cameras. Also within the existing vehicle were equipments which would no doubt spur many organisations into recalling their own experiences with the operation of such units as the B3724 vision mixer, B3740 special effects, B4011 line clamp amplifier and VR1200 video recorder.

A major factor in the award of this contract to Marconi were the features and versatility offer-

ed by the Mark IX convertible camera. The camera may be adapted for use in a portable EFP (Electronic Field Production) mode, with a head weight of only 10kg including the viewfinder and 15 to 1 zoom lens, or as a studio type camera by the inclusion of the 7 inch viewfinder and camera mounting saddle. Fully automatic operation and broadcast quality is a requirement of the Federation to ensure that cameras are aligned ready for use on arrival at location with little delay and minimum engineering staff requirements, both major factors in outside broadcast operating costs. The Mark IX automatic facilities of registration and colour balance comfortably meet these requirements.

The colourisation will involve the following process steps in order to successfully achieve the projects aims:

- (i) The removal of non-colour compatible and outdated equipments along with selected redundant cables and



# Marconi Gets The Double

A team from Marconi Communication Systems went to the races and successfully demonstrated that both the Mark IX camera and the MR2 video tape recorder are winners by pulling off a double.

The venues were the Singapore Turf Club at Bukit Timah, Singapore and the Selangor Turf Club at Kuala Lumpur, Malaysia. These are the two largest clubs within the Malayan Racing Association with club histories dating back to 1842 and 1895 respectively. Each club now has an annual turnover of several millions of dollars thereby benefiting many people with large donations going to local charities and payments of the government taxations.

The prizes won by Marconi, against fierce competition from other runners from Europe and Japan, were two independent contracts for the supply, delivery, installation, operation and maintenance of professional colour television systems at the race tracks.

The orders placed through the local representatives, The General Electric Company of



Singapore racecourse.

Singapore Private Limited and The General Electric Company of Malaysia Sdn Bhd, will each include three MK IX automatic television cameras fitted with 42x zoom lenses and four MR2 'C' format video tape recorders as a basis of the operations.

The object of each system is primarily to serve two independent functions yet utilizing the same resources. These functions are:

**Public Viewing** — High quality monitoring around the course and grandstand will allow spectators to follow the racing in 'close up' even when they have no direct view of the track thus increasing spectator participation.

**Race Judging** — Recordings made from all three cameras onto three independent video recorders will enable the racing stewards to review and judge each race as necessary for any objection or inquiry with the minimum of delay. The superior quality and versatility of the system will ensure a high standard of racing.

In addition to achieving the above objectives the systems will allow a permanent record to be made of each race meeting as a source of reference and entertainment for either social or business purposes.

On completion of the installations at Singapore and Kuala

Lumpur it is the intention of the Malayan Racing Association to link all clubs via the Telecomms trunk microwave network. This will allow racing at any one club to be watched by 'off course' spectators at other clubs within the network.

The three cameras at each course will provide total coverage of the track, cameras one and two will be sited on camera towers located at each end of the starting and finishing straights respectively. These two cameras will provide head on shots of the race, including the important break from the starting gate, and are recorded for use normally by the stewards only. Camera three will be sited on top of the grandstand, in line with the winning post, and is used for coverage of each race in its entirety. The output from this third camera will be fed to the public viewing system in addition to being recorded for the stewards.

Immediately after each race recorders one, two and three will be switched over to a remote control panel in the stewards inquiry room where judging takes place to establish the result of any objection or foul. Meanwhile the fourth recorder can be used to provide replay to the public viewing system. Each

recorder has variable slow motion facilities to aid the stewards decisions and to add additional novelty and excitement for the spectators.

At the end of each days racing it is envisaged that the tape on recorders one, two and three will be edited down onto machine number four to keep, on a single reel of tape, a complete record of the days events.

Each system includes a comprehensive switching, distribution, and patching arrangement in the control room of the turf clubs. This will allow maximum versatility of the system so as to be adaptable to the operational requirements of the Turf Clubs for a long time in the future.



Mk IX camera being demonstrated at Singapore racecourse.

# Cameras for BBC Scotland

Work is now in progress installing three Marconi Mark IX colour camera video equipment and ancillary units in Studio B, Broadcasting House, Glasgow. The contract, worth more than half a million pounds, is part of the BBC's plans for the improvement of regional television facilities.

The Marconi Mark IX colour cameras on this contract are the first to be delivered with Automatic Beam Reserve (ABR) facility. This enables users to install standard photoconductive tubes in the camera and still have protection from highlight overload without the extra expense of Highlight Overload Protection (HOP) or Anti-Comet Tail (ACT) tubes.

Other refinements on these camera channels include two-turn focus control, an a.c. power outlet at the camera head, and two separate remote control panels for the camera iris joystick and the colour balance controls.

The order also includes the design and manufacture of pro-



Representatives from BBC discussing the studio equipment.

duction control desks, monitor stacks and many custom designed control panels, as well as an engineering control position and camera cable patch panel in the vision apparatus area.

When completed towards the end of 1981 this studio will include a 16 input vision mixer with extensive facilities for red, green, blue (RGB) and downstream keying and comprehen-

sive special effects, backed up by a 32 input 16 output preview matrix and over 35 monochrome and colour picture monitors. The studios will enable BBC Scotland to improve their production of news and actuality programmes, which already provide several hours of live items each week for Scotland as well as numerous valuable contributions to the BBC National Network.

# Outside Broadcast Vehicle for ITN

It was in the late 1930s that the first television outside broadcast vehicle was designed and manufactured by Marconi. Since those early days a lot of experience has been gained in their design and manufacture and today's vehicles range from small go-anywhere cross country vehicles to large sophisticated vehicles for specific purposes.

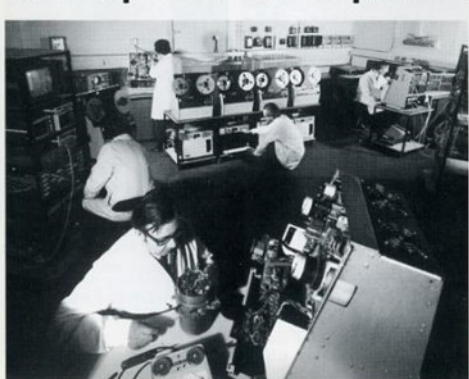
The latest order, worth over a quarter of a million pounds, is for a new OB vehicle for Independent Television News. The two/three camera vehicle, based on a Bedford TK860 chassis, will be equipped with a Marconi MR2 video tape recorder, Marconi switching units and B4006 distribution amplifiers. The vehicle also includes a 10 input vision mixer, three 15-inch colour monitors, one 11-inch monitor and eight 9-inch monitors, a waveform monitor and vector-scope and an 'off-air' receiver for cueing, line-up and general monitoring of transmitted signals, with a comprehensive custom designed communications system.

The Marconi MR2 1-inch helical scan Video Tape Recorder

with automatic scan tracking and time base corrector offers facilities previously unavailable in vehicles of this size. At half the size and cost of Quad machines the MR2 provides broadcast high quality performance with still frame and variable slow motion and a video confidence facility. A dual synchronizing pulse system includes genlock facilities and a remote control panel. This will enable the OB van to be used in conjunction with either a studio or another OB van without mainstream synchronism problems.

This is the first OB van to be provided to ITN by Marconi and will be designed in close collaboration with ITN engineers to provide a very compact but full facility unit. Last year ITN, the London based non-profit making company which provides the daily programmes of national and international news to all the UK Independent Television Stations, purchased eight Marconi Mark IX studio colour television cameras and a Mk IX portable head.

# Video tape recorders in production at Chelmsford



Video tape recorders undergoing final assembly and test.

Following the agreement enabling Marconi Communication Systems to market the new generation of broadcast-quality helical video tape recorders, initial sales were based on imported machines whilst preparations went ahead for manufacture in Marconi's Chelmsford factory. The preparations have been completed, the MR2 video tape recorder and its companion the MTBC2 digital time base corrector are now in full production.

Improvements in design have been included in the Marconi manufactured equipment. Typical of these is the transport deck. This is a substantial casting on which the accuracy of alignment of the critical tape transport components depends. To improve tolerances an additional final lapping process is

applied, giving a superior surface flatness to the reference face of the casting.

In electrical testing of the MR2 and MTBC2 a very high level of confidence is achieved by use of the Marconi Instruments' Autotest Automatic Electrical Inspection System, prior to the final overall functional tests.

The MR2 video tape recorder is a continuous-field, non-segmented helical-scan machine conforming with the EBU and SMPTE Type C format. Using 1-in tape, the MR2 is economical in operation, and the still-frame and variable-speed replay capability of the Type C format provides excellent editing facilities which are widely acclaimed by broadcasting authorities and television production houses. For mobile operations, electronic news gathering for example, the compatible MR20 portable video recorder is available.

The addition of the MTBC2 digital time base corrector to the recording system ensures the very high video signal timing accuracy necessary in broadcasting operation. Other facilities provided in the MTBC2 include a particularly effective tape drop-out compensator.

Completing the system is the unique Marconi B4624 Monitoring Unit, which includes both comprehensive v.t.r. monitoring facilities and time-base corrector controls. Introduced to satisfy the need for an ergonomically-designed unit to complement the MR2, the B4624 has been welcomed by operators and has already gained a considerable number of orders. No modifications to the machine, time base corrector or monitors are required to install the monitoring unit, which is also compatible with the MR1.



## BBC Radio 1 and Radio 2 at Start Point Cyprus Relay Station

Marconi Communication Systems Antenna Division have recently completed a two mast medium frequency antenna system for the BBC at Start Point, Devon which provides the south west of England with Radio 1 and Radio 2 programmes.

The r.f. matching and phasing networks combine Radio 1 at 1053kHz and Radio 2 at 693kHz into a single directional two mast antenna system. The system is directional to reduce the coverage on the seaward side of the site, and has a number of reserve and standby facilities to enable either Radio 1 or Radio 2 or both to be radiated omnidirectionally.



The power dividing and phase control cabinets for Radio 1 and Radio 2 at BBC Start Point.

A contract worth almost £1.9M has been awarded by the Foreign and Commonwealth Office to Marconi Communication Systems for improvements to the broadcast relay station at Zyi, Cyprus from which BBC External Service programmes are beamed to many parts of the world.

The contract includes the supply and erection of new self-supporting towers, twenty-five high-power high-gain antennas type R9010 and the dismantling of a number of existing towers. The project has to be carried out with the minimum of interruption to the existing services and will take about two years to complete.

The R9010 antenna is a wideband array of horizontal dipoles in a vertical plane in front of an aperiodic reflecting screen of horizontal wires. The antenna is horizontally polarized ensuring that antenna gain and radiation characteristics are almost independent of the ground conductivity at the transmitting site.



Marconi wideband wideslew centrefed dipole curtain array. R9010 similar to those to be installed in Cyprus.

Since the radiation characteristics are flexible the antenna can be tailored to suit a particular route. A second array may be placed on the reverse side of the reflecting screen. This means that when slewing capabilities are taken into account, a single antenna system on four guyed masts can cover a wide range of target areas (up to 160° total coverage). This can represent a significant saving in site area as well as in equipment and installation costs.

## Independent Local Radio Transmitter



Coder and 4 Watt Drive.

Broadcasting Division of Marconi Communication Systems has received an order worth almost £¼ million from the Independent Broadcasting Authority for 28 low-power Band II F.M. transmitters, as part of their local radio expansion plan.

The transmitters are designed around the B6504 F.M. drive equipment which is manufactured under licence by Eddystone Radio (part of the Marconi organisation). Wideband amplifiers and ancillary equipment is being supplied by Norsk Marconi, which, when used in conjunction with the drive units, will produce transmitters of 300W and 600W output power. The responsibility for systems design and the modification of the drive equipment to suit the particular IBA require-

ments is in the hands of Marconi Communication Systems.

The transmitters will be installed in either passive or active standby pairs on 14 sites throughout the United Kingdom, and will expand considerably the existing stereophonic Independent Local Radio service in this country.

Deliveries are required to commence in November 1981 and be complete by the middle of 1982 in order for the IBA to fulfil their on-air commitment to the programme contractors.

This contract is a good example of the co-operation between companies within the Marconi Group, when correct interfacing of the equipments can produce well engineered systems.

## Broadcasting returns to Writtle

Writtle, a village in mid Essex, near Chelmsford, can be considered the home of broadcasting. It was here, in February 1922, that Marconi's Wireless Telegraph Company station '2MT' went on the air broadcasting half an hour per week. This was followed three months later by the opening of station '2LO' in London—the first station taken over by the BBC when it was formed in November 1922. Now in 1981 broadcasts will again be beamed from the Writtle area from an MF/VHF antenna structure supplied and installed by Marconi Communication Systems. The antenna system is one of two supplied to the Independent Broadcasting Authority for Essex Radio, the independent local radio station with its administrative base and main studio in Southend-on-Sea and another studio in Chelmsford. The second antenna is an MF umbrella type R5071 situated at Rayleigh in the south east corner of the county and comes into operation at the end of August 1981.

Marconi m.f. umbrella systems which have been supplied for a number of local radio stations include features that fulfill the stringent requirements of such operators. Basically, the operator requirements are to keep costs to a minimum whilst still providing a satisfactory coverage and, since antennas tend to be large and unsightly, to reduce environmental problems to a minimum.

Since normal antennas are about one quarter of their wavelength in height, the cost of the basic structure at the low frequencies often operated by local radio, is disproportionately large in comparison with the cost of the transmitter itself. The Marconi Umbrella system, in which the antenna is 'folded' so as to reduce its height, is less than half the size of conventional systems, making a very considerable saving on the cost of installation. In addition the transmitter can be attached directly to the antenna without the need for an expensive antenna tuning unit.

## Norsk Marconi AS—Capability



Founded in 1919 Norsk Marconi is a fully autonomous company and part of GEC-Marconi Electronics Ltd.

Norsk Marconi operates jointly with its associated UK companies in the implementation of projects and as a consequence continuous liaison covering many aspects of technical, logistic and contractual matters takes place.

Norsk Marconi has met the

unique challenge of providing television and FM radio coverage in Norway where the remoteness of transmitter sites makes maintenance costs a major factor. This was made possible by developing for the Norwegian Telecommunications Administration a range of advanced, reliable re-broadcast equipment geared to a well planned maintenance philosophy.

Norsk Marconi has gradually become more project orientated to exploit the skills it has developed, particularly in the fields of wideband amplification, synthesized frequency sources and precision AM-modulation. The Company has developed and supplied large quantities of advanced linear power amplifiers to CERN (The European Council for Nuclear Research) in Geneva.

Norsk Marconi is also active in the fields of development and manufacturing of aeronautical navigation aids and supplies a complete line of instrument landing system (ILS) equipment.

## BBC Buys Field Synchronizers

The BBC has recently purchased from Marconi Communication Systems seventeen digital television field synchronizers type B3565 for use in the Television Centre, Wood Lane, London and for use in their outside broadcast applications.

This economical and compact unit employs the latest digital techniques to provide a most useful adjunct to television systems. By the use of a high quality 16K MOS RAM store, it enables a non-synchronous signal to be stored for a full field and then read out synchronously with the local pulses. This avoids the need to genlock and disturb the local pulse system which can then be used simultaneously for VTR recordings.

Over 28 of these units are now in service in the UK, Belgium, Australia and New Zealand.

## New 10 and 20kW transmitters for f.m. broadcasting

A new range of Marconi f.m. broadcasting transmitters includes 10kW and 20kW designs using many parts in common thus reducing manufacturing, installation and maintenance costs. Both transmitters are self-contained, the cooling fan and output harmonic filter being accommodated within the compact transmitter cabinet. Only one valve is employed, in the final stage, all earlier stages using solid-state devices. The drive system, designed by the BBC, provides flexibility for mono or stereo transmission, and for paralleled or working and standby transmitters.

Achieving 60% overall efficiency or better, the new transmitters are cost effective, and meet the latest IEC requirements for personnel safety.



The 20kW transmitter.

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## The Latest Tubes from EEV

Professional Electron Tubes for TV and Radio applications will be featured by the English Electric Valve Co Ltd, a GEC Company on stand number 554. These products will include:

- ★ Leddicon® camera tubes for broadcast television cameras.
- ★ Vidicons for telecine cameras, caption scanners and X-ray fluoroscopy applications.
- ★ Amplifier Klystrons for sound and vision transmitters.
- ★ Power Tetrodes and Vacuum

Capacitors for broadcast transmitters.

- ★ High Brightness Character Display Tubes for clocks, competition scoreboards and information displays.

On display for the first time at Montreux will be the new P8420 Leddicon designed for the most advanced studio cameras. This is a 30mm diode gun tube with low output capacitance target, 1 inch scan format and variable light bias.