MARCONI
Communication Systems
Number 16

Large defence communications order

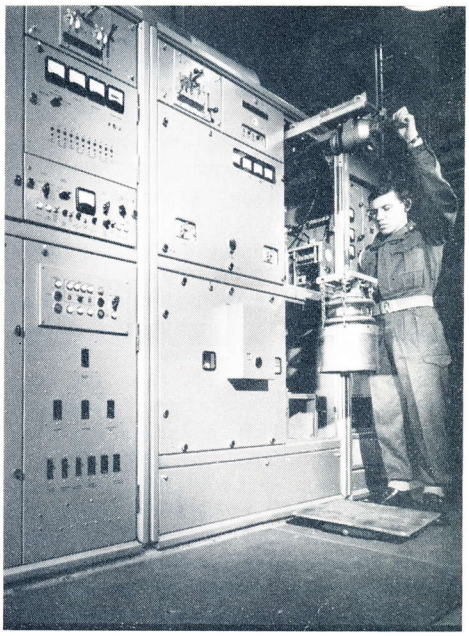
The British Ministry of Defence has placed an order worth more than a quarter of a million pounds for h.f. communications equipment. The Ministry have many installations in the United Kingdom and overseas employing Marconi equipment, and this latest order is required to update some of these. It follows a similarly large order for a complete h.f. communication system for a large overseas base.

This latest order will be employed in part as a replacement for older Marconi HS Type transmitting equipments which have proved exceptionally reliable over many years, and which are still in wide use by Posts and Telegraph authorities throughout the world.

In this instance they are to be replaced by MST h.f. equipment, which is a much more compact and far more easily operated range of equipment.

The Marconi Self-Tuning (MST) systems were designed specifically to improve traffic handling capability on h.f. circuits by the introduction of automation, and to achieve a considerable saving in operational time and man-power. MST means maximum available traffic time with the minimum skilled operating staff.

MST systems are in world-wide use on major international circuits, providing high quality communication with the maximum of facilities. Many defence organizations also employ MST for long-haul h.f. systems. One interesting application is a completely transportable containerized high-power system for use in NATO.



A 30kW MST transmitter.

First sale of new TV transmitter to North America

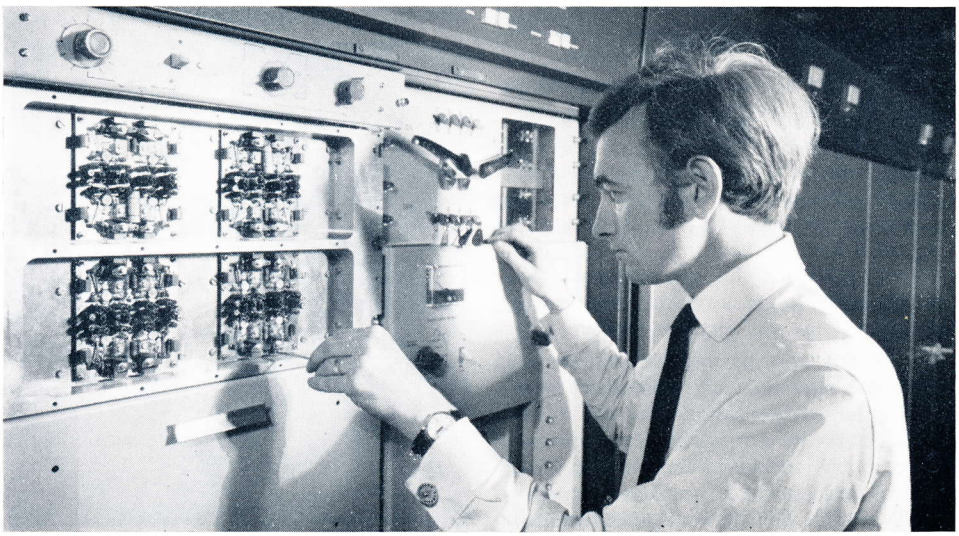
Broadcasting Division has sold a B7103 series v.h.f. television transmitter in Canada. This is the first sale of a transmitter from this brand new range in North America, and was achieved in the face of strong American competition.

The sale was made through the Canadian Marconi Company to Bushnells Communications Limited of Ottowa, and is for a new 12kW transmitting station to serve 70,000 homes in the Kingston and Belleville areas on the shores of Lake Oratorio. The transmitter site is isolated and the transmitter will be run unattended with remote control for the main facilities.

Installation will take place during this summer and the station is due to start transmission on 1st September. Though only introduced recently, eighteen transmitters from this new range have been sold.

The B7103 Series incorporates the most advanced concepts of television transmitter design. The range covers all frequencies in Bands I and III and powers from 500W to 15kW. All transmitters are completely self-contained, and include the combining unit, test load and harmonic filter, making for easy installation and neat appearance. The 500W and 1kw versions use only one output valve, and the higher powers only three.

Because of the trend towards unattended operation, special attention has been paid in the design to reliability, and high-grade solid-state devices are used to the utmost. Not only have solid-state circuits been used to a higher power level than ever before in the r.f. stages, but they are also used wherever possible for control and protection. Bandwidth is determined by the use of passive stable networks used in conjunction with wideband amplifiers, not subject to critical tuning.



Adjusting the drive of a B7103 transmitter on test.

Marconi Communication Systems Limited,
Marconi House,
Chelmsford, Essex, England.
(A GEC-Marconi Electronics Company.)

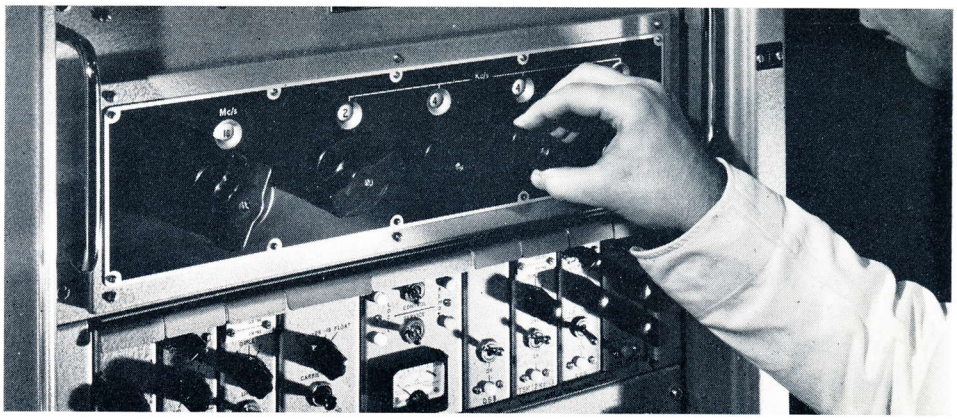
Hungary orders drive equipment

Elektromechanikai Vallalat, the Hungarian manufacturers, have ordered quantities of h.f. drive equipment from Radio Division. Based in Budapest, Elektromechanikai Vallalat manufacture, among other advanced technological products, communications equipment which is exported to various parts of the world.

This is the third order for drive equipment to be received from E.M.V., and consists of units from the well-known Marconi Self-Tuning (MST) range. E.M.V. chose Marconi drive equipment because of its well-proven performance in MST systems, £14M worth of which are in operation in more than 40 countries of the world. These systems are to be found in a wide variety of climatic conditions from the sub-arctic to the tropics.

Though introduced more than seven years ago, MST was so far in advance of existing systems that it has maintained its leading position ever since. The heart of the drive system is the H1500 frequency synthesizer which accepts a 100 kHz modulated input and covers the band 100kHz to 29·999MHz. Its major advantage is its excellent frequency stability, and this combined with rapid frequency selection and its inherently 'fail-safe' system, whereby incorrect frequencies cannot be delivered, make it ideal for use by less-skilled operators. It accepts an input from a high stability 1MHz frequency source,

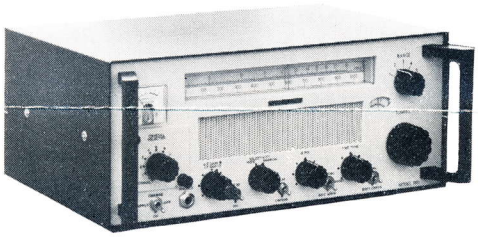
Other major items in the MST Drive system are the comprehensive modulator unit (H1503), which provides a fully comprehensive and flexible source of modulated signals for h.f. communications, and a high-quality wideband amplifier which raises the level of the modulated output from the synthesizer at the radiated frequency to a level suitable for feeding the transmitter.



Setting up frequency on MST drive equipment.

New range of Eddystone receivers

Eddystone Radio have introduced a brand new range of receivers to take the place of some of their well-tried and successful lines, which have become to some extent superseded by the introduction of newer techniques. The new range, to be called the 1000 Series, replaces the lower-priced receivers, built to the well-known high standard of mechanical construction, such as the 840 and 940 Series. These are in world-wide use in such varied applications as ships' entertainment and communications, h.f. point-to-point monitoring and interference tracing. They are also extensively used by discriminating amateurs and other listeners prepared to buy a better-than-average receiver.



Eddystone 1000 series receiver.

The 1000 Series is designed to cover many applications, but it is based on a single design concept, whereby the function can be decided by the assembly of basic modules. At present five models are available in the range and include high-quality sets for shortwave and general reception, models 1000 and 1001; a superior broadcast receiver including stereo f.m., model 1002; a marine receiver for reserve and watch-keeping purposes, model 1004; and a specialized facsimile receiver, model 1005.

Models 1001, 1004 and 1005 have a novel crystal control arrangement giving the user the option of ten switchable crystals contained in an easily removable front panel plug-in module. All the receivers are built to the highest technical standards and have a pleasant, functional appearance.

Power supplies can be 100/125V or 200/250V a.c. or 12V (or to special order 24V) external battery, with an internal 12V rechargeable battery for short-term emergency operation.

For maximum reliability, extensive use is made of integrated circuits and FETs.

Model 1004 has already been approved by the British Ministry of Posts and Telegraphs for use at sea, and a large number have already been sold.

TRANSATLANTIC DATA LINK

Joseph Lucas Limited, the world-wide suppliers of automobile and aerospace components, have ordered a Marconidata H6020 data transmission system from Line Division to enable them to increase the efficiency of communications with their North American organization.

The system will link the Joseph Lucas head office in Birmingham, England, with their establishment in Montreal, and will consist of a Type H6020 series transmitter and receiver at each terminal with paper tape readers and automatic answering facilities.

The H6020 terminals are of the latest design which incorporates facilities that enable them to be used on satellite communication links. This entails the incorporation of a special 512-character store, which enables the full 97% transmission transfer efficiency, with error control, to be maintained whilst coping with the propagation line loop delay times inherent with synchronous satellite working. They can equally be used on long-distance cable links.

The Marconidata terminals will be used for two kinds of traffic:—

(a) Normal message traffic (engineering/administrative, etc.) between any Lucas location in Great Britain and Lucas locations in Montreal, Englewood, N.J. and Detroit.

(b) Stock control data transmission between the Lucas Aerospace support centres in Englewood and Montreal.

On both sides of the Atlantic transmission between the Marconidata terminals and other locations will be by telex.

Joseph Lucas maintains a widespread spares service for the aviation industry. Speed in providing spares for aircraft is of the utmost importance and the new link will help considerably in maintaining the efficient stock control essential to the successful running of an operation of this size and complexity.

The advantages of passing data rapidly in a world-wide basis has only recently become evident to large organizations. In the last issue we recorded the sales of Marconidata terminals to Cable and Wireless for a link between Hong Kong and London which is capable of working over the satellite link. Several other Marconidata links are operating on the transatlantic cable links.

Marconidata H6010 Series data transmission equipment.

New material for ferrites

Specialized Components Division, which specializes in the development and manufacture of advanced ferrite components, have recently introduced a new range of narrow linewidth garnet ferrites for use in the most stringent applications where ultra-low loss and extremely wide bandwidth are required. These find applications in a large range of ferrite circulators and isolators, and are particularly suitable for microwave integrated circuits. The very narrow linewidths which they offer enable circulators to be biased closer to resonance, thus making it possible to obtain simultaneously wider bandwidth and lower insertion loss.

The materials used in this new series, Y-70, comprise saturation magnetizations (at 20°C) between 800 and 1900 gauss, including narrow linewidth equivalents of commonly-used conventional aluminimum-doped garnets between 800–1760 gauss. The saturation magnetization of 1900 exhibited by the new material is the highest value of magnetization yet to become available in materials of garnet structure.

We have referred in these pages before to the unique process used for the manufacture of ferrite materials which enables an almost infinite range of final shapes to be manufactured to extremely fine tolerances. To achieve the very high pressures needed to anneal the powdered ferrite materials evenly into the required shapes, a specially adapted 6in naval gun is used. Soft rubber moulds, containing the powdered material, from which all the air has been evacuated, are immersed in a hydraulic fluid in the gun barrel, the end of which is sealed, and the breech closed. The fluid is then pumped up to 15 tons per square inch and the powder is forced into a solid block inside the moulds. Since pressure is applied evenly in all directions, blocks are free from stresses which might distort it when it is fired.

Ferrite rods being inspected.

The new materials are available in a variety of bulk shapes and sizes, including bars, discs and cylinders.

John Clater

Marketing Manager—Line Division

John Clater, B.Sc., M.I.E.E., was born in Gibraltar and educated at St. Boniface College, Plymouth. From 1936 to 1939 he worked on exchange, transmission and telegraph systems in the British Post Office Engineering Department, Southern Region. Throughout the war years he served with the Royal Engineers and Royal Signals with the rank of Major and was mentioned in dispatches. After obtaining an engineering degree at Bristol University, he joined the Marconi Radio Division in 1949 as project engineer and subsequently as P.A. to Manager, Sales Section Chief, Chief of Sales Engineering, and finally Chief of Contracts and Export Sales.

From 1962 to 1966 he was Marketing manager of the Exchange Switching Division of GEC (Telecommunications) Limited. He has served on the EEA Radio Committee and is presently on the TEMA Transmission Committee.

He returned to Marconi in 1966 to join the newly formed Line Division as Marketing Manager. His work covers transmission and switching systems for data, telegraph and telephone communications including PCM in all parts of the world.

Big Mobile Radio order for ambulances

The West Sussex Ambulance Service will be the first to be equipped with the latest GEC Mobile Radio equipment which enables them to maintain contact with their base when they are temporarily away from their vehicles. In a £26,000 contract, West Sussex has ordered 55 high-powered mobile f.m. radiotelephones for their ambulances and seven f.m. transportable 'Courier' radiotelephones, as well as two main base stations.

Ambulance Services in U.K. are transferring to high-band frequency modulated working during the next two years. West Sussex is among the first to make the change. They are taking advantage of the unique features of the RC602/TR high power, duplex mobile transceiver. This makes possible an exclusive 'talk through' facility which enables ambulance officers, equipped with RC505/TR hand portable sets, to talk to and receive messages from their base station whilst they are away from their ambulance via their ambulance transceiver. This means that urgent messages can be passed direct from the scene of an accident or similar incident, without an operator having to return to the ambulance. The advantages of this system in such cases as rail or road disasters, when the ambulance cannot be positioned close to the incident, are obvious.

GEC Mobile Radio RC 505/TR in use at an ambulance exercise.

An additional advantage of the talk-through facility is duplex operation, which is being used in this case, enabling ambulance crews to be connected via their base control through Hospital telephone exchanges direct to doctors within their Hospital.

The RC602/TR f.m. v.h.f. transmitter receiver operates on up to six pre-set channels in the 68-174MHz bands, with a nominal r.f. power output of 25W.

Another exclusive feature of the RC602/TR talk-through and duplex applications is that a cavity resonate filter is used in the aerial circuit allowing single-aerial working as opposed to the normal two-aerial working for this type of application.

The RC505/TR is a compact, lightweight, single unit hand-portable operating in the v.h.f. f.m. band with a 3-channel capability.

The base station, an RC710/TR transceiver capable of transmitting up to 60W r.f. power output, is remotely controlled via u.h.f. links in this case, but can also be supplied for local or extended control.

Television cameras for Turkey

The Turkish Radio and Television Administration has ordered more than £200,000 worth of television camera equipment from Broadcasting Division. The order is for 17 Mark V 4½-inch Image orthicon cameras and ancillary equipment.

These will be used in extensions to the Turkish Television Services and for backing up existing facilities. The cameras will be employed in Studios already in existence in Ankara and Izmir.

The contract was obtained against inter national competition and TRT's choice is in accord with the decisions of many other television organizations to standardize on the 4½-inch image orthicon camera for their black-and-white services.

Marconi pioneered the 4½-inch image orthicon camera. It was developed from an experimental tube originally produced by Otto Schade of RCA for the U.S. Navy. The possibilities it held for use generally in television were recognized by a Marconi engineer, George Partington, during a visit to RCA in 1947.

A good deal of development work was done both on the tube, which was undertaken by English Electric Valve Company, and on a camera capable of realizing the tube's potential, which was carried out by Broadcasting Division This lead to the production of the Marconi Mark III camera in 1954, which was the first of a line of I.O. cameras the latest of which is the Mark V. This incorporates the latest solid-state technique and is designed for "hands off" operation. More than 1500 Marconi 4½-inch Image Orthicon cameras have been sold all over the world since its introduction.

Denmark orders high-power h.f transmitting system

The Danish Post and Telegraph authority have in the past ordered several MST 30 kW h.f. transmitters for use in international trunk routes and for their world-wide shipping interests. They now reinforce their confidence in this equipment by a further order for a 30kW transmitter (H1200), for installation at their Skamlebaek Station. In addition to the transmitter a complete comprehensive drive assembly (H1601) is included in the order.

Skamlebaek is remotely controlled from Copenhagen, and for the long distance shipping transmissions frequency and directional aerials have to be changed at frequent intervals.

The H1200 is a 30 kW p.e.p. linear amplifier having a self-tuned final stage and untuned wideband amplifiers for the earlier stages. Only three variable tuning controls are used for matching the input to the final stage and tuning and loading the output circuit, making possible the adoption of fully automatic fast self-tuning techniques. Additionally, the input level to the amplifier is automatically regulated.

The transmitter is completely self-contained, with access from the front only. The antenna matching is maintained accurately at all times in spite of changes in autumn impedance due to varying weather conditions.

To ensure long term reliability only a minimum number of moving parts are employed, and these are to the highest engineering standards using top quality materials.

Jamaican space link opens

A further Marconi satellite communications earth station has come into operation with the inauguration of the Jamintel Earth Station at Prospect Pen, St. Thomas, Jamaica. The official opening was on 29th January but the station had gone into traffic a month earlier. At the opening of the ceremony the then Prime Minister of Jamaica, the Hon. H. L. Shearer and the Minister of Communications and Works, the Hon. N. C. Lewis placed the inaugural call via the television link to London. Messages from the British Prime Minister, Mr. E. Heath, were read and a live TV broadcast from the BBC in which the Jamaican High Commissioner in London, Sir Lawrence Lindo, and the Chairman of Cable and Wireless, Colonel D. McMillan exchanged messages with Mr. Shearer and the Jamintel Chairman, Mr. A. Dujon.

The pictures received from London via the Marconi-built Post Office Earth Station at Goonhilly Down were excellent.

The week before the opening was rendered rather hectic because the Intelsat III flight 7 satellite failed, and traffic had to be transferred to Intelsat III flight 6. This was followed by a complete station re-configuration in preparation for the changeover to the new multi-access satellite, Intelsat IV flight 3. The station has coverage of North America and Europe.

The inauguration ceremony at Prospect Pen of the Jamaica satellite earth station.

It uses a standard Marconi 97 ft diameter antenna, and is the second such station to come into operation in the Caribbean in recent months, the first being that of Matura in Trinidad. A third, at St. John's, Barbados, is due to come into service shortly.

It incorporates the latest microstrip receivers, which eliminate bulky waveguide assemblies and reduce the size and weight of the whole receiver system. They also considerably increase the reliability of the system. The antenna structure at Prospect Pen is specially strengthened to withstand earthquakes and hurricanes to which the area is subject.

PCM goes to college

Marconi PCM equipment in use at Hull Corporation telephone exchanges.

Plymouth Polytechnic has taken a lead among the Polytechnics in the U.K. in ordering a Marconi pulse code modulation (PCM) link from Line Division, for instructing their Communications Engineering Degree students in digital techniques.

The order, which is for a standard 24-channel system type U1310, also includes line transmission equipment and signalling units, and will enable students to simulate actual line conditions. Digital techniques are impinging increasingly on the daily life of all of us, and this PCM system will allow students to study in detail the technical aspects of their use.

Marconi have had considerable success with PCM, and they are major suppliers of systems to the British Post Office and overseas telephone authorities. They are also the only manufacturer in United Kingdom to have supplied system to other organizations having large telephone systems, such as British Rail and London Electricity Board.

Line Division has considerable experience in digital techniques, and these have been applied in many new systems and equipments which are of considerable importance. A significant extension of their work in pulse code modulation is in the design of an automatic electronic telephone switching system called MARTEX. Major elements of this advanced system are being incorporated in the Cordless Switching System (CSS2) which the Division is developing for the British Post Office.

The Division's Marconidata range of data transmission, modem and multiplexing/demultiplexing equipments are in wide use for the rapid transfer of information in digital form.

The PCM equipment will be very advantageous to students in giving them an insight into these new techniques, which will confront them when they leave the polytechnic.