Military HF Communication Systems

THE STANDARD TYPES of HF equipment developed by the Marconi Company for use by the major commercial services of the world are also used for long-distance military systems, since the operational requirement is the same for commercial and military applications.

However, equipment has been developed to cater specifically for military short-distance mobile services and medium-distance point-to-point systems. The Company has also used its wide planning and engineering experience to assist military authorities in designing and developing this type of equipment.

EQUIPMENT

Military requirements are specific and well-known. Equipment must be fully flexible and capable of integration with established networks. It must also be completely self-contained. Maintenance must be very easy, and mechanical durability is important. The system technique must be advanced but the operation simple. Performance and frequency stability must conform to the highest international standards.

Equipment is designed to fit many roles. In the past mobile services have been confined to DSB radio-telephony, with the addition of CW or MCW telegraphy. These services are now no longer sufficient and the latest equipment must provide for SSB/ISB telephony, FSK and VF telegraphy. Communications systems must be capable of being set up by the field operators as a comprehensive HF network or as a series of temporary or semi-permanent point-to-point links. Operation is normally over medium distances, using sky-wave propagation. In this sort of role the equipments can also be made fully static as distinct from the normal requirement of mobility and on-the-move operation on short-distance links and networks. These military systems, using low and medium power, are also operated as remote-control systems.

For this wide range of application the aerial systems used range from whip-type or 'V' aerials (for mobile operation) to dipole or long-wire aerials (for temporary fixed operation) and rhombics (for more permanent operation).

HIGH-GRADE PERFORMANCE

SSB and ISB speech systems with local carrier insertion require the receiver tuning to remain within 30 c/s of the correct position in order to avoid 'drop-outs' due to fading of the received carrier signal. On FSK telegraphy the error must be less than 10% of the total frequency shift, and with SSB and VF telegraphy at 50 bauds per channel the receiver tuning must remain within 20 c/s, or the AFC needs to be accurate enough to maintain these figures.

For 'net' working the absolute frequency stability must be of this order without AFC. With the new types of equipment it is now possible for teleprinter 'nets' to be successfully operated in the field.

For military systems in general, stability needs to be of a high order in view of the rigorous field conditions involved.

In this range of equipment the usual power requirement is about 350 W (although versions of the equipment with a power output of 1 kW PEP are available). The demand is for keying speeds on FSK up to 200 bauds. A double diversity receiver is used in certain cases and a 2-channel VFT equipment may also be employed. Single-path reception is used in the case of mobile and medium-distance links.

Special attention should be paid to the specification outlined in the data summary on page 259 which shows the order of performance required. The diagram, page 257, shows the interconnection of units in a typical 350 W type station using a single receiver, indicating that the control of the system both operationally and from the point of view of system re-arrangement, is in the hands of the operator and can be simply achieved, including remote control.

To summarize, the wide HF military requirement can no longer be met by what has been known as a general-purpose type of equipment. It can be satisfied only by equipment of specific design to precise specification.

The equipment and engineering is such that different installation arrangements are possible. A station can be contained in vehicles or containers. Installation is undertaken by the Company or can be accomplished by military authorities themselves, either to their own plans or plans produced by the Company.

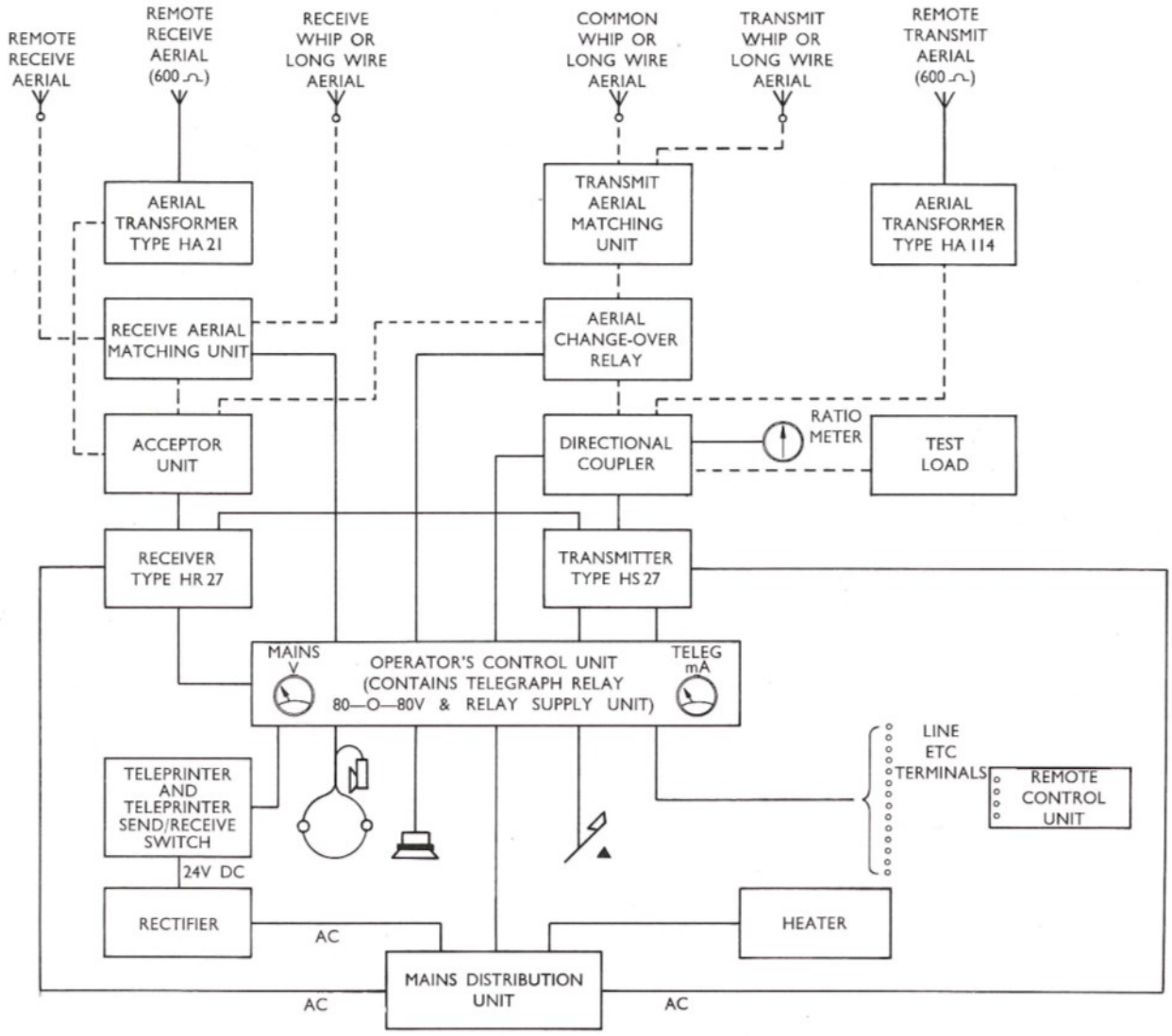
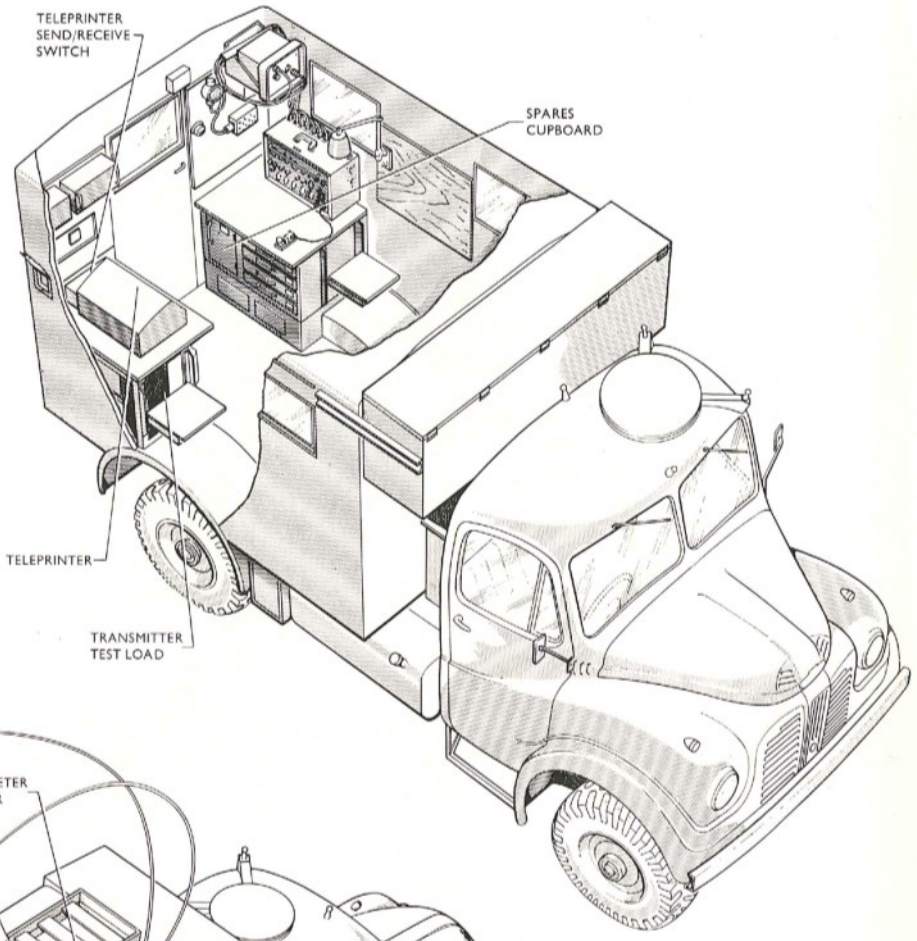
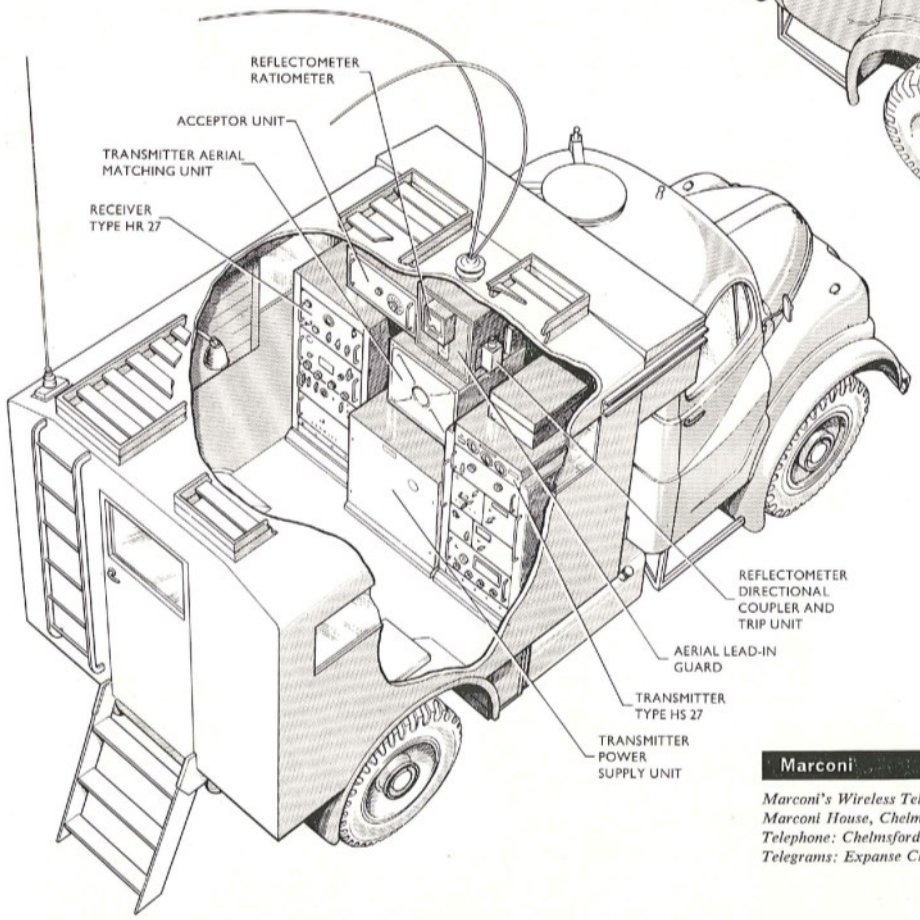


Diagram showing interconnection of the units in a typical military HF station.

Type HS27/HR27
HF Radio Equipment installed in a vehicle.





Marconi

Marconi's Wireless Telegraph Company Limited
Marconi House, Chelmsford, Essex
Telephone: Chelmsford 3221 • Telex: 1953
Telegrams: Expanse Chelmsford Telex