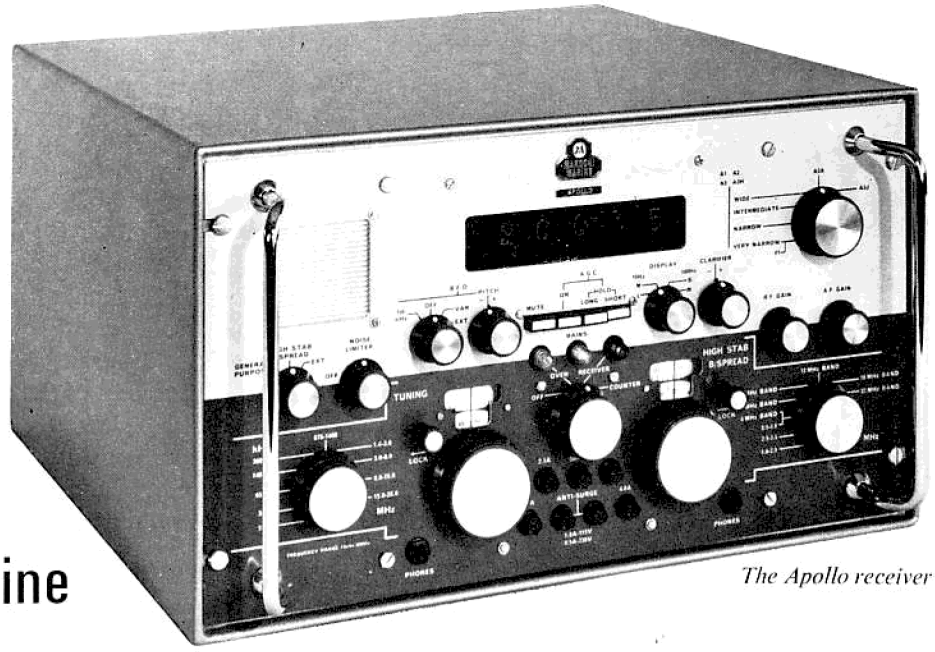
Two new ssb/general purpose marine receivers from Marconi Marine



The Apollo receiver

Meet APOLLO and NEBULA

Everybody concerned with maritime communications knows that conditions have deteriorated considerably during the past decade simply because of the high volume of traffic. In 1960 the world total of ship radio stations was about 34,000. This number has since gone up by approximately 1,000 new installations per annum with a consequent crowding of the channels available for communication, aggravated even more by new uses – more radiotelephony, high-speed automatic telegraphy, facsimile transmission of weather charts, etc. In fact, the radio channels have become like the roads, inadequate for the traffic they have to carry.

The 1967 World Administrative Conference of the International Telecommunications Union, recognising that the technology was available to design the specialised equipment necessary for single-sideband communication at sea, introduced new international regulations calling for a progressive change to ssb, which, in effect doubles the number of channels available by making it possible for two communications to flow simultaneously in the channel space previously occupied by one.

To meet the requirements of the new regulations Marconi Marine have recently introduced into their wide range of communications equipment two entirely solid-state ssb/general purpose receivers—Apollo and Nebula.

APOLLO

Both the Apollo and the Nebula have been type-approved by the Ministry of Posts and Telecommunications to the same current specifications—GPO Spec (1965) for a main radio receiver; GPO Spec TSC102 (1968), for an HF ssb radiotelephone receiver; GPO Spec TSC105 1968 (receiver section) for ssb radiotelephony in the band 1605-3800kHz, appendix 2; MPT Spec (draft II, 1970) MPT 1201, for a main radio receiver with dsb and ssb facilities; and MPT Spec MPT1208 issue 1, draft performance specification for a main radio receiver with dsb reception.

The Apollo receiver is, however, very much the 'big brother' to the Nebula as in many respects it exceeds the performance demanded by these specifications. The Apollo also has the distinction of

being the first marine communications receiver to have been type-approved to the new MPT requirements.

The reception modes of the Apollo are A1 (CW), A2 (MCW), A3 (DSB) and A3A/A3H/A3J(SSB). F1 (for FSK) reception is also available.

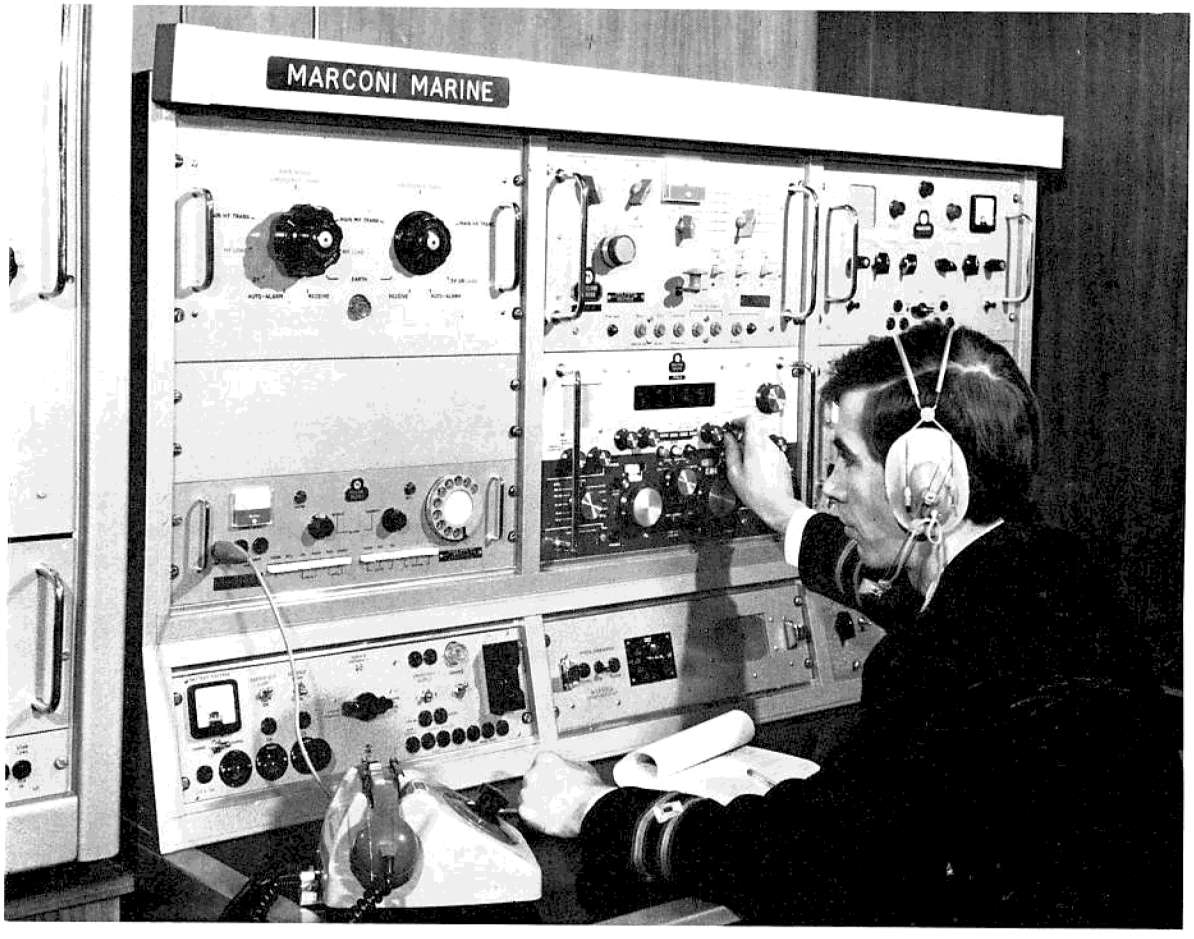
For general purpose reception the frequency coverage of the Apollo is 15kHz to 28MHz. This is arranged in ten overlapping switchable bands containing all the normal marine ssb and dsb radiotelephone frequencies.

Special automatic gain control circuits are incorporated while the IF filters ensure a high degree of selectivity—two features which assist considerably in ensuring high-quality ssb reception.

For this good quality ssb reception, a high degree of frequency stability is absolutely essential. In the Apollo the problems of frequency drift due to temperature variations are largely overcome by the frequency control provided by a partial synthesis system, and the use of solid-state devices in the design. Indeed, when Marconi Marine's new Apollo ssb receiver is in its high stability mode the typical frequency stability figures show a drift of only 5Hz per hour at 29MHz sixty minutes after switch-on.

On dsb slight mis-tuning of a receiver can be tolerated since the carrier is transmitted with the intelligence and is detuned in the same ratio, but precise tuning of the receiver is vital in ssb reception. This is because, on ssb, the carrier is a fixed frequency generated in the receiver and introduced on receipt of the transmitted intelligence, therefore any mis-tuning of the receiver creates a difference in

In situ—Marconi Marine's new Apollo fitted in a communications console



Compactness and reliability are among the key features of the new Marconi Marine Nebula receiver

ratio between the intelligence and carrier frequencies and reduces intelligibility.

To meet this problem the Apollo has, incorporated in its design, a highly accurate frequency counter with a digital read-out. This allows the receiver to be first tuned mechanically to within 100Hz of the required frequency, and then to be tuned electrically to within 10Hz. As this frequency counter measures the incoming radio frequency via the first local oscillator and is not an integral part of the receiver circuitry, the receiver will not be rendered inoperative should the counter fail as is the case with some fully synthesised receivers. Tuning of the Apollo can still be achieved by use of the logging scales.

Another advantage of the digital presentation of tuned frequency is that the necessity for preliminary calibration of the receiver for high stability operation is eliminated.

It is interesting to note here that because the frequency counter is not an integral part of the receiver circuit it can be operated as an independent frequency meter and can therefore be used as a measuring instrument when working on other equipment in the radio room.

This precision of setting which could not be achieved with a conventional mechanical scale, plus the high degree of frequency stability, enables the Apollo to anticipate future requirements for selective calling, for which the receiver is set on frequency to await reception of the ship's allocated code which precedes a scheduled transmission.

NEBULA

The Nebula might be classed as junior to the Apollo but this neat receiver has some points of its own and not least among these is its compactness. The Nebula measures only 5·25in (133mm) high, 17·9in (455mm) deep and 19in (483mm) wide, making it suitable for standard rack or console mounting, and is ideally suited when space is at a premium.

This compactness has been achieved by the use of entirely solid-state circuitry throughout. The majority of components are mounted on printed circuit cards which are contained in plug-in modules. This feature lends itself to the modern methods of servicing by substitution.

The ssb and dsb reception modes of the Nebula are identical to those of the Apollo and the frequency coverage is 10kHz to 30MHz, with high stability operation for ssb working on frequencies above 1·6MHz.

Audio output is provided via headphones or an internal loudspeaker and circuit arrangements have been made to allow external loudspeakers or transmitter telephones to be connected.

In meeting the new ITU and MPT regulations, the Apollo and Nebula mark the beginning of a new era in marine receiver design.