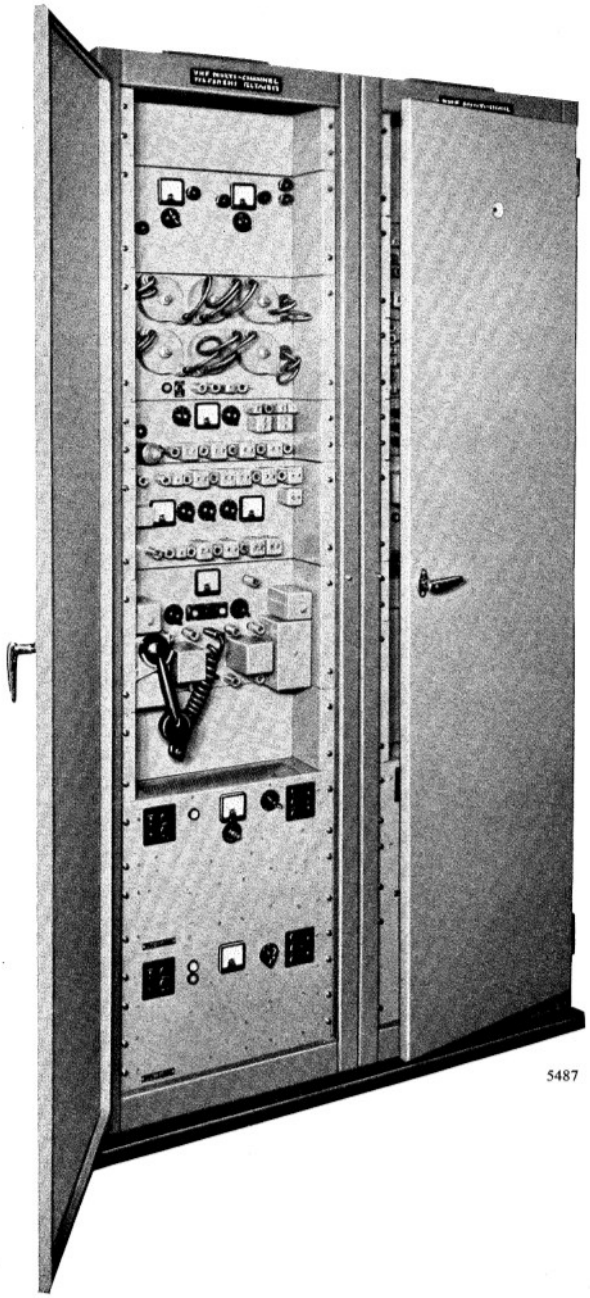
VHF Multi-Channel Repeater Units

HM 150 Series



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IN ORDER TO INCREASE the total distance over which a multi-channel communication link can operate, repeater units are placed at different points in the route. Essentially, the repeater functions as a frequency-changing RF amplifier, and two equipments are necessary at each station to accommodate the 'go' and 'return' paths. The aerials are necessarily adjacent, and in order to avoid instability due to slight coupling that may exist between transmitting and receiving antennæ, a change in frequency is introduced. Demodulation and remodulation are not necessary and non-linear distortion is therefore kept to a minimum.

The units are constructed in the same way as the Type HM 100 series terminal units (see page 233), and housed in the same type cabinets.

CIRCUITS

The feeders from the transmitting and receiving aerials are so arranged that they present a theoretically infinite impedance to all unwanted frequencies. A signal received at the repeater is then fed to the aerial filter and thence *via* a junction box to an RF amplifier stage. The multiplied output from a local crystal oscillator is then combined with the received signal in a frequency changer to produce a resultant IF which is duly passed to the transmitting section. The use of a comparatively low IF enables adequate gain and selectivity to be obtained more easily than by employing a single-frequency changing technique only.

The amplified signal passes to another frequency-changer stage where it is mixed with the multiplied output of a second crystal oscillator. The resultant frequencies pass through two further amplification stages before the final stage and thence *via* a junction box to the transmitting

aerial filters. The same procedure is carried out with signals in the other direction.

SUPERVISORY AND ALARM

For supervisory purposes, looping is achieved by sending a fixed tone to the repeater in question which has a selective receiving system. This causes a relay to close which operates a 'turn-round' circuit which causes the far-side receiver to seize the output of the far-side transmitter. Test signals can then be sent round the loop and the necessary measurements made.

An engineers' order wire with speech and ringing facilities is also available and a thermostatic relay initiates an alarm signal in the event of fire breaking out at any repeater.

DATA SUMMARY

Frequency ranges:

Type HM 151 60–73 Mc/s.
Type HM 152 73–85 Mc/s.
Type HM 153 132–150 Mc/s.
Type HM 154 150–185 Mc/s.
Type HM 155 185–230 Mc/s.
Operation on any specified frequency.

Frequency stability: ±0·005% within the temperature range 0–50°C.

Gain stability: Output variations do not exceed ±1 db over a receiver input range of 10 μV to 10 mV.

Power output: 10–20 W according to frequency range.

Output impedance: 70 Ω, unbalanced.

Spurious radiation: 100 db below carrier level.

Selectivity: Attenuation of a signal removed 2 Mc/s from centre frequency not less than 40 db.

Modulation: Input of 10 dbm in 600 Ω produces a deviation of ±15 kc/s.

Noise factor (measured with aerial filters out of circuit): Better than 6 db below 100 Mc/s.
Better than 9 db above 100 Mc/s.

Power supplies: 105–150 V or 200–250 V, 40–60 c/s single-phase AC mains. Voltage regulation ±6%, frequency variation ±2½%.

Power consumption: 1·1 kVA.

Dimensions:

Height	Width	Depth
7 ft	3 ft 10 in.	2 ft
(213 cm)	(117 cm)	(61 cm)