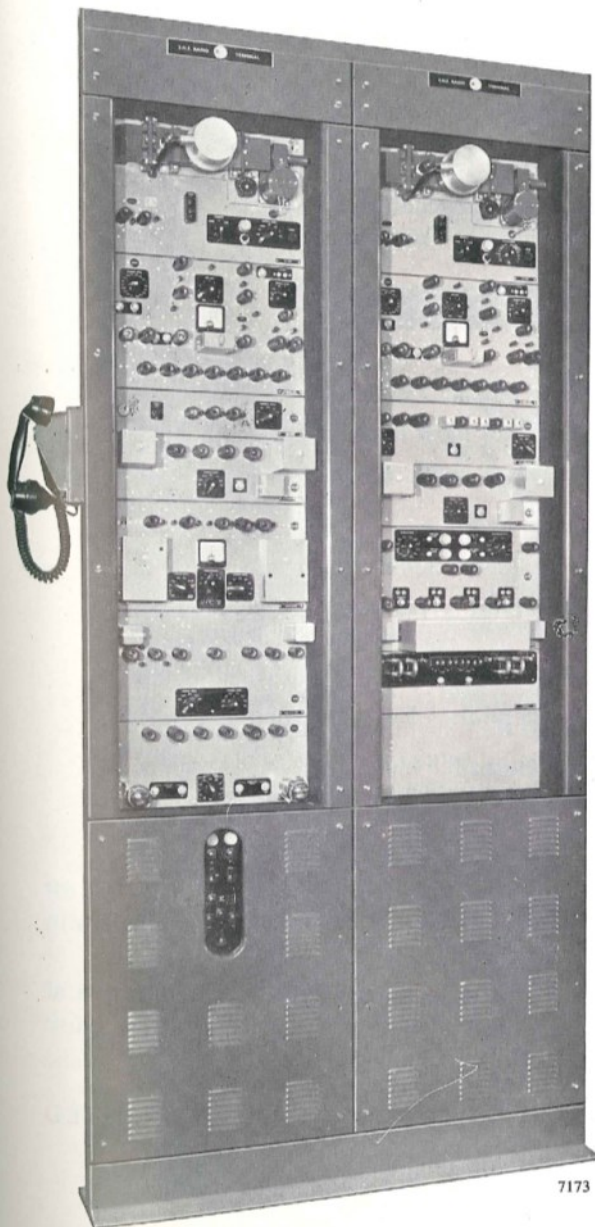




SHF Multi-Channel Equipment

HM 300 and 350 Series



THIS RADIO TELEPHONE/TELEGRAPH EQUIPMENT is designed to provide both terminal and repeater stations for use in complex links requiring several repeaters. Operating in the SHF band, it is particularly attractive for use in areas of high man-made electrical noise. Frequency modulation is employed.

FEATURES

Used in conjunction with carrier equipment employing 4 kc/s channel spacing, 60 telephone channels to CCIF grouping can be accommodated; using carrier equipment employing 6 kc/s channel spacing, 40 channels.

The frequency of the SHF power oscillator is stabilised by a special AFC system.

Inter-panel wiring is conveniently housed in the vertical channel-section members of the aluminium racks.

Many units are common to transmitter, receiver and repeater racks.

Engineers' order wire facilities are provided.

CONSTRUCTION

The *terminal equipment* comprises two 7 ft 6 in. high racks of 19 in. wide recessed panels, one rack for receiving and one for transmitting equipment.

The *repeater equipment*, which is of the frequency-following type, is also accommodated in two racks 7 ft 6 in. high.

CIRCUIT

The power oscillator is standard in all racks and consists of a velocity-modulated tube using a tunable cavity resonator.

TRANSMITTER: The line input frequency modulates a 20 Mc/s oscillator whose output, multiplied to about 180 Mc/s, feeds a silicon crystal.

This crystal produces a band of harmonics which have stability, linear modulation and correct deviation. One of these harmonics, about 70 Mc/s removed from the power oscillator, is selected and used to provide modulation and AFC for the relatively unstable power oscillator.

RECEIVER: The received signal is mixed with some of the output of the power oscillator, the remaining oscillator power being absorbed by a dummy load.

The demodulation system is similar to that used for AFC on the transmitter, the discriminator providing both line output and AFC for the oscillator.

REPEATER: The repeater is of the frequency following type, the only difference from the receiver being that the dummy load is replaced by a wave-guide and aerial which radiates approxi-

mately 99% of the power oscillator output. The re-radiated signal is removed in frequency from the received signal by 70 Mc/s.

ENGINEERS' ORDER WIRE: At a terminal the EOW channel is applied to the modulator whereas at a repeater it directly modulates the power oscillator.

AERIALS: Parabolic aerials of the half-dish type are employed, with waveguide feed. Where long waveguide runs would be necessary due to the height of the tower, the aerials can be mounted near the base of the tower directed at passive reflectors fitted at the top.

POWER SUPPLIES: Selenium and valve rectifiers are used. The equipment is normally operated from 200–250 V, 50 c/s single-phase AC mains, but diesel alternator sets, suitably rated, may be supplied when required.

DATA SUMMARY

GENERAL

Frequency range: 3900–4200 Mc/s.
4400–4800 Mc/s.

Overall frequency tolerance: 100 parts in 10^6 .

Aerial input and output impedance:

$2\frac{1}{2} \times 1\frac{1}{4}$ in. waveguide or (with passive reflectors) 75 Ω cable.

Channel deviation: ± 200 kc/s RMS.

Max. overall deviation: ± 600 kc/s RMS for 60 channels.

Modulation frequency range:

EOW and supervisory: 300 c/s–6 kc/s.

Traffic: 12–312 kc/s.

Operating conditions: 0–50°C up to 95% humidity for continuous operation.

Power supplies: 200–250 V ($\pm 6\%$) AC, single-phase, 45–65 ($\pm 2\frac{1}{2}\%$). Consumption: 0.95 kW for terminal, 0.8 kW for repeater.

Dimensions of basic single-path terminal or repeater:

Height	Width	Depth	Weight
7 ft 6 in.	3 ft 5 in.	1 ft 4 in.	560 lb
(228 cm)	(104 cm)	(40 cm)	(254 kg)

TRANSMITTER

Power output: 250–500 mW.

Modulator input impedance: 75 Ω unbalanced.

Modulator input level: –40 to +5 dBm per channel.

RECEIVER

Noise factor: Better than 14 dB.

Bandwidth: ± 2 Mc/s at 3 dB down
 ± 11 Mc/s at 40 dB down

Output impedance: 75 Ω unbalanced.

Output level: –5 to –30 dBm per channel.

OVERALL PERFORMANCE

Frequency response:

EOW: 300 c/s to 6 kc/s, ± 1 dB

Traffic: 12 to 312 kc/s, ± 2 dB

Interchannel crosstalk (worst channel): –52 dB for a single hop, terminal to terminal, with 60 channels.

Required input power for baseband s/n ration of 60 dB relative to peak dev.: –86 dB relative to 1 W.

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