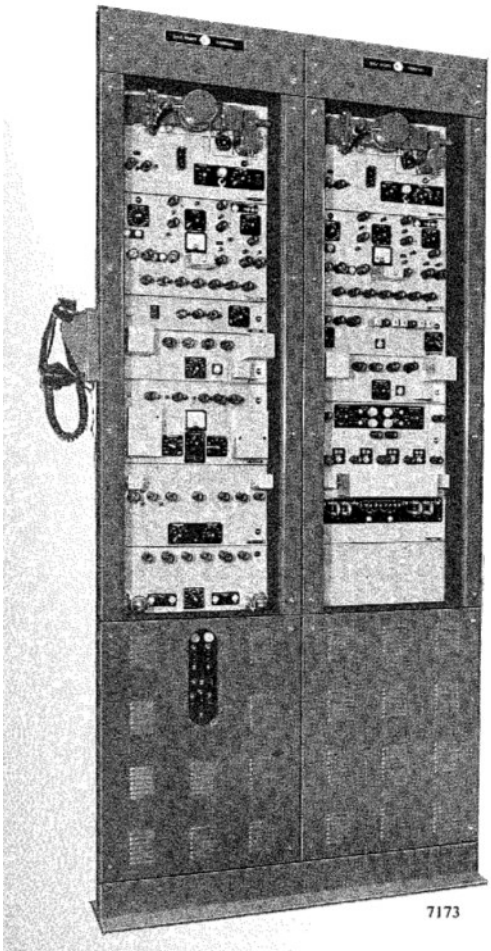
# SHF FM 60-channel Radio Link Equipment
## HM 310 and HM 360 Series

THIS EQUIPMENT is designed to provide both terminal and repeater stations for use in complex links requiring several repeaters. It is particularly attractive for use in areas of high man-made electrical noise.

### Features

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



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The frequency of the SHF power oscillator is stabilized 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.

### EQUIPMENT

Terminal and repeater equipments are made up of standard 19 in. wide panels mounted in two 7 ft 6 in. racks, one rack for receiving and the other for transmitting units.

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 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 power oscillator.

*Receiver.* The received signal is mixed with some of the output of the power oscillator.

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, deviation being reduced by only 0·9 dB per repeater. The re-radiated signal is removed in frequency from the received signal by 70 Mc/s.

*Aerials.* A cross-polarized waveguide horn feeding a parabolic half-dish, provides a common aerial for a duplicated transmitter-receiver system.

### Data Summary

GENERAL

**Frequency ranges:** 4400–4800 Mc/s.

**Overall frequency tolerance:** 150 parts in $10^6$.

**Aerial input and output impedance:** Waveguide No. 11 or (with passive reflectors) 50 Ω low-loss coaxial cable.

**Channel deviation:** ±200 kc/s RMS.

**Max. overall deviation:** 400 kc/s RMS for 60 channels.

**Modulation frequency range:**
EOW and supervisory: 300 c/s–5 kc/s.
Traffic: 12–312 kc/s.

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

**Power supplies:** 200–250 V (±6%) AC, single-phase, 45–65 (±2½%). Consumption 0·95 kW for terminal, 0·8 kW for repeater.

**Dimensions of basic single-path terminal or repeater:**
Height 7 ft 7⅛ in. (230 cm)
Width 3 ft 5 in. (104 cm)
Depth 1 ft 4 in. (40 cm)
Weight 560 lb (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:**
±10 Mc/s at 3 dB down.
+26 −21 Mc/s at 40 dB down approx.

**Output impedance:** 75 Ω unbalanced.

**Output level:** −5 to −30 dBm per channel.

OVERALL PERFORMANCE

**Frequency response:**
EOW: 300 c/s to 5 kc/s, ±1 dB.
Traffic: 12 to 312 kc/s, ±1 dB.

**Interchannel crosstalk:** −56 dB unweighted (reference channel level) for a single hop, terminal to terminal, in worst channel of 60-channel system.

**Basic noise:** −58 dB, unweighted, reference channel level, for a single hop, terminal to terminal in worst channel of 60-channel system.

### Marconi

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