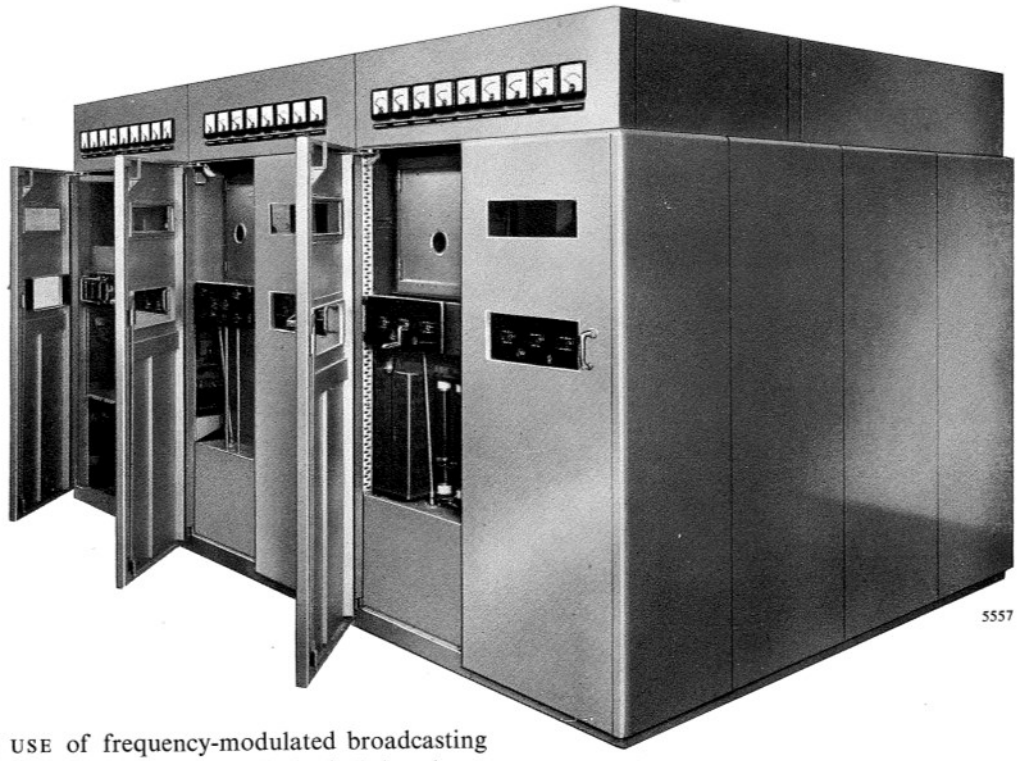
25 kW FM Broadcasting Transmitter *Type BD 307*



THE USE of frequency-modulated broadcasting technique is at present very limited. It has, however, very decided advantages over its amplitude-modulated counterpart, and these are now being explored by many broadcasting administrations among whom is the British Broadcasting Corporation. Their Wrotham station employs the Type BD 307 air-cooled transmitter, which has been designed to give a high-grade performance at any frequency in the band 85–100 Mc/s.

The equipment is built up from six sub-units which are assembled together to form the complete transmitter. Doors provide access to the front of the units and the enclosure may be entered by means of a side door.

FEATURES

High stability and exceptional reliability are ensured by the use of the FMQ (frequency modulated quartz) drive unit.

The use of grounded grid Class C amplifiers results in high efficiency.

Full monitoring facilities are provided by means of a special FM monitor which can be supplied with the transmitter.

The transmitter is forced air cooled throughout.

All controls are mechanically operated and provided with revolution counters.

Sequence switching and overload protection safeguard the equipment, whilst electro-mechanical interlocks ensure the safety of operating personnel.

Remote switching and certain remote metering facilities are provided at the control desk.

CIRCUITS

The FMQ drive unit is directly modulated. The modulating signal is applied through a low-pass filter and attenuator to a pre-emphasis valve and thence to a balanced pair of push-pull modulator valves. These valves are also fed *via* a phase-splitting transformer, with the RF output from the crystal oscillator. The quadrature output is coupled to a modulator amplifier which is directly across the crystal oscillator circuit. The frequency modulated output is then passed *via* a buffer to multipliers where it is brought up to the radiated frequency.

The first amplifier stage uses a double tetrode valve operating as a push-pull grounded-cathode Class C amplifier. This is followed by a pair of tetrodes similarly arranged to constitute the second amplifier, balanced transmission lines being used in both anode circuits. The signal is fed to the cathode of the third amplifier, the conductors forming a resonant line, and the stage operates as a grounded-grid Class C amplifier. The power level is raised further in the fourth amplifier which is an exactly similar circuit to the previous stage. Resonant quarter-wave lines are used in the anode circuits of these stages. A similar technique is employed in the penultimate amplifier and the final stage employs two parallel-connected grounded-grid Class C amplifiers.

The output feeder passes through a quarter-wave matching transformer and thence into a coaxial pattern harmonic filter. Provision is made for switching to either the aerial feeder or into a test load.

DATA SUMMARY

Power rating: 25 kW.

Frequency range: 85–100 Mc/s.

Frequency stability: Better than ±0·002% for a temperature rise of 20°C and a supply voltage fluctuation of ±6%.

Output impedance: 51·5 Ω unbalanced.

Frequency deviation: ±100 kc/s maximum (±75 kc/s corresponding to 100% mod.).

FM noise level: At least 70 db below the level corresponding to ±75 kc/s deviation with a 400 c/s modulating frequency.

AM noise level: At least 50 db below the level corresponding to 100% modulation at 400 c/s.

AF distortion: Less than 1·5% from 30 to 60 c/s and less than 1% from 60 c/s to 15 kc/s, at 75 kc/s deviation.

Audio pre-emphasis: 0, 50, 75 and 100 μs networks are provided.

AF response

±0·5 db from 30 c/s to 8 kc/s
−3 db at 15 kc/s
−10 db at 20 kc/s
} relative to 400 c/s

AF input level: +4 dbm for 40% modulation.

Input impedance: 600 Ω balanced.

Power supplies: 415 V, three-phase, 50 c/s AC mains.

Power consumption: 96 kVA at 0·9 power factor.

Dimensions:

	Height	Width	Depth
Transmitter Enclosure	7 ft (213 cm)	13 ft 3 in. (404 cm)	8 ft (244 cm)
Power Supply Enclosure	7 ft (213 cm)	15 ft 3 in. (466 cm)	9 ft (274 cm)

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