3-Megawatt S-Band Transmitter/Receiver

Type SR 1000

INCREASING aircraft speeds are placing ever-greater demands on long-range radar systems. Solid radar coverage over a maximum possible range is sought after in all fields, and this calls for transmitters capable of very high-power outputs.

Type SR 1000 represents the outcome of extensive development in this sphere and embodies in a single unit a transmitter and receiver answering modern long-range requirements, both civil and military.

FEATURES

Very high-power output—2½ to 3 megawatts.

Unattended operation, with full remote control facilities.

Notably efficient control system, fool-proof, and with entirely automatic sequencing.

Advanced automatic monitoring system, including continuous display of transmitter power, standing wave ratio and receiver noise factor.

Immediate indication given when a valve ceases to function adequately.

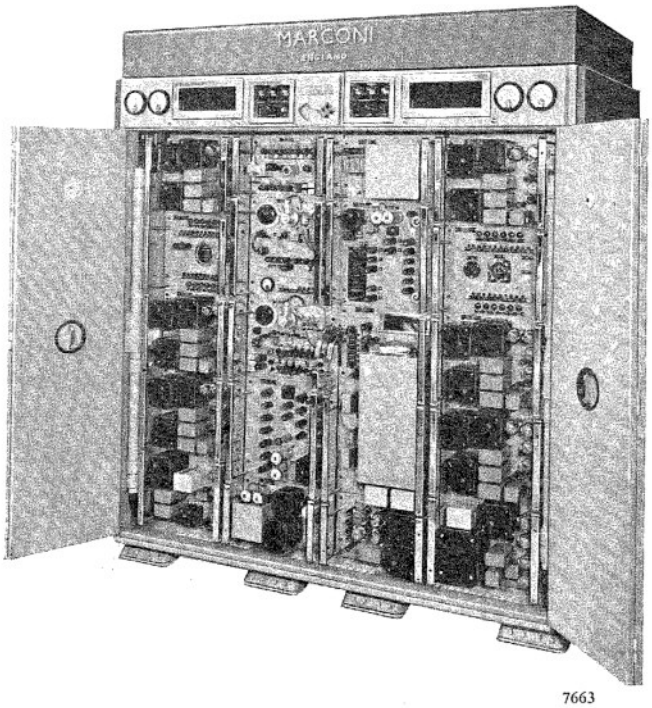
Simultaneous linear and logarithmic video outputs.

Impressive mechanical design, affording excellent accessibility for servicing.

Full built-in test facilities.

CONSTRUCTION

The equipment is housed in an attractive, shock-mounted cabinet with sliding front doors. The larger units are mounted within the cabinet itself, while the smaller ones are contained in two gate-like frameworks of angle construction which fold across the front of the cabinet, being hinged to either side of it. The cabinet doors enclose these gates and full protective interlocks are incorporated. No rear access is required.



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General cooling is effected by six fans mounted in the top of the cabinet, and air filtering is incorporated. The magnetron is additionally cooled by a water jacket fed from a closed system and therefore independent of any external water supply.

Operational controls are grouped together conveniently at the top of the equipment.

CIRCUIT

Transmission. The transmitter triggering circuits are operated either by an external triggering

source (which may be a pulse, square wave or sine wave) or by an internal, free-running, 300 c/s oscillator.

The triggering pulse fires a thyratron which operates the high-level modulation circuit. The modulator uses a conventional DC charging circuit to charge a pulse-forming network. The output pulse from this network is transformed and fed to the magnetron, which oscillates for the duration of the pulse.

The magnetron output is launched straight into the waveguide feed to the aerial system. A very efficient T/R system is incorporated, consisting of two 3 dB binomial directional couplers with associated T/R cells.

Reception. The received echoes are fed to the receiving circuits via an additional ATR cell. A coaxial-ring type of hybrid mixer and a klystron local oscillator are employed and the IF signals at 13·5 Mc/s are amplified in two separate amplifiers, one linear and one logarithmic.

After detection, the video signals are amplified and provide linear and logarithmic outputs respectively, for feeding to the display system of the radar.

AFC and full modulator protection circuits are included.

Control. The comprehensive control system is designed so that the switching sequence is entirely automatic from the moment the 'on' button is pressed. Dekatron counting tubes are used in the sequencing circuits. Overload and phase failure protection circuits are incorporated. The overload protection mechanism is self restoring for intermittent overloads, shutting the equipment down only for persistent overloads.

A comprehensive lamp indication system gives precise information of the prevailing conditions.

Monitoring. The integral monitoring facilities enable principle waveforms to be compared with their correct shape and all other essential functional details to be checked.

A spectrum analyser is included, by means of which magnetron and IF response frequency spectra can be examined, and AFC discriminator characteristic checked.

An incorporated computor mechanism enables receiver noise factor, transmitter power and standing wave ratio to be displayed on Dekatron tubes.

Full metering facilities are incorporated including an hour meter for registering the total operating time of the equipment.

DATA SUMMARY

Frequency band: 2700–2900, 2900–3100 or 3100–3300 Mc/s.

Peak power output: 2·5–3 MW.

Pulse recurrence frequency: 200–550 p.p.s.

Pulse length: Any fixed value between 2·5 and 5·5 μs.

Noise factor (overall): 8·5 dB max.

AFC: Pull-in range: ±5 Mc/s.
Hold-in range: ±10 Mc/s.
Deviation per Mc/s drift: 5 kc/s.

Intermediate frequency: 13·5 Mc/s.

Receiver bandwidth: 0·4 Mc/s.

Output signal-to-noise ratio: 10:1.

Transmit/receive protection: 44 dB min.

Max. ambient temperature range: −30°C to +55°C.

Power supplies: 380–415 V 50 or 60 c/s (±5%), 3-phase AC.

Power consumption: 18 kVA max.

Dimensions:

Height	Width	Depth	Weight
7 ft 3 in. (221 cm)	6 ft 1 in. (186 cm)	3 ft 4 in. (102 cm)	2 tons 8 cwt (3000 kg)

Marconi

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