



## Frequency Synthesizer Type H 1500

THIS fully transistorized synthesizer drive equipment is available in two versions:

Edition C, which accepts a 100 kc/s modulation input and covers the band 100 kc/s to 27·9999 Mc/s.

Edition E, an unmodulated version, covering the band 3·0000 to 30·9999 Mc/s.

The required frequency may be selected in a matter of seconds by adjusting a series of decade controls designated Mc/s, 100 kc/s, 10 kc/s, 1 kc/s and 100 c/s, the decade dials indicating the output frequency.

### Features

Excellent frequency stability.

Instant frequency selection.

Inherently a 'fail-safe' system in which incorrect frequencies cannot be delivered.

Complete transistorization greatly improves reliability and serviceability and eliminates problems due to overheating.

Edition C can be modulated, thus eliminating external mixers.

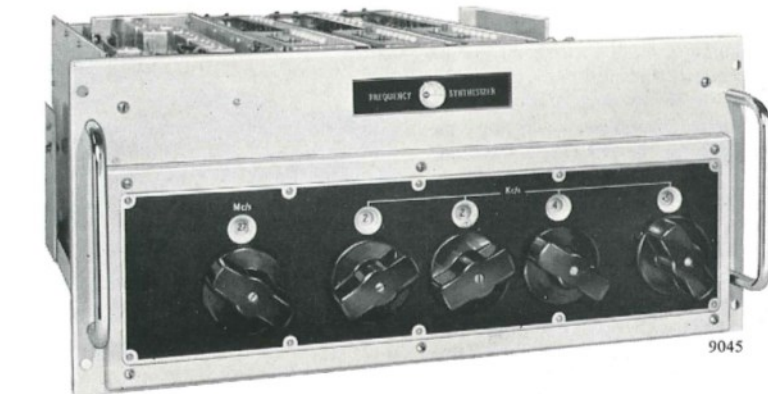
### EQUIPMENT

The unit is small and compact and may be mounted in a standard 19 in. (48 cm) rack or cabinet.

All frequencies are derived from an external 1 Mc/s master oscillator, the stability of which is reflected in the output of the synthesizer at the exact 1 kc/s steps. The 100 c/s steps are derived from a free-running interpolating oscillator, for which a means of calibration at its upper and lower limits has been provided.

The basic 1 Mc/s input from the master oscillator is broken down in the standard-frequencies generator by means of a series of frequency dividers of the regenerative-modulator type, to provide standard frequencies of 100 kc/s, 10 kc/s and 1 kc/s. These are filtered and amplified before being applied to the appropriate 'adders', in which the process of synthesis takes place. An auxiliary output at 100 kc/s is also available via a co-axial socket for application to associated equipment.

The 'adders', which are identical except for frequency order, employ a triple-mixer process and are connected in cascade to produce the required frequency. In Edition C, a fourth mixer in the 10 kc/s adder accepts a modulated input on a sub-carrier of 100



kc/s and the output frequency is delivered with the impressed modulation.

### Data Summary

**Frequency stability:** This is dependent upon the stability of the 1 Mc/s source employed.

A typical performance, when using the Master Oscillator Type H 1501, will be:

Spot frequencies at 1 kc/s intervals:  
Short-term,  $\pm 1$  part in  $10^8$  (per day).  
Long-term ageing, less than  $+5$  parts in  $10^8$  (per month).

Temperature coefficient: Over the range  $-15^\circ\text{C}$  to  $+55^\circ\text{C}$ ,  $\pm 3$  parts in  $10^8$ .

100 c/s interpolations: Short-term,  $\pm \frac{1}{2}$  c/s (per day). Long-term,  $\pm 3$  c/s (per month).

Temperature coefficient: Over the range  $-15^\circ\text{C}$  to  $+55^\circ\text{C}$ ,  $\pm 3$  c/s.

**Overall instability per day with  $10^\circ\text{C}$  ambient temperature range:** 100 c/s steps, less than  $\pm 1\frac{1}{2}$  c/s at 27·5 Mc/s.

**Frequency ranges:** 3·0000 to 30·9999 Mc/s (Ed.E) and 100 kc/s to 27·9999 Mc/s (Ed.C).

**Auxiliary output frequencies:** 100 kc/s from standard-frequencies generator.

**Standard input frequency:** 1 Mc/s at a level of 0·5 to 1V in  $75\ \Omega$ .

**Output levels:** Main output, 5–20 mW. Auxiliary output not less than 10 mW.

**Output impedance:**  $75\ \Omega$  unbalanced.

**Spurious components:** No spurious component (other than harmonics) exceeds  $-65$  dB relative to the wanted output.

**Harmonics:** Relative to level of wanted output:

- $-25$  dB at frequencies below 2·5 Mc/s.
- $-30$  dB at frequencies between 2·5 and 3·5 Mc/s.
- $-36$  dB at frequencies between 3·5 and 5·0 Mc/s.
- $-40$  dB at frequencies above 5·0 Mc/s.

**Noise:** Noise and hum modulation of output not greater than  $-60$  dB relative to carrier.

**Intermodulation (Ed.C only):** Third-order products of the order of  $-50$  dB ref. p.e.p, fifth-order products negligible when output level is limited to 5 mW p.e.p.

**Power supplies:** 100–125V or 200–240 V 50–60 c/s a.c. mains.

### Dimensions:

Height	Width	Depth (excluding handles)
7 $\frac{3}{4}$ in.	17 $\frac{1}{2}$ in.	21 in.
(19·7 cm)	(44·5 cm)	(53·3 cm)

Front panel	Width
19 in.	8 $\frac{3}{4}$ in.
(48·3 cm)	(22·3 cm)



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