

## CHAPTER 9

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### Design and Performance of a 100 Mc/s Harmonic Generator

In this chapter, the design and performance data are presented of the harmonic generator which generates, in satisfactory amplitudes, as 10th harmonic, the frequency of 100 Mc/s.

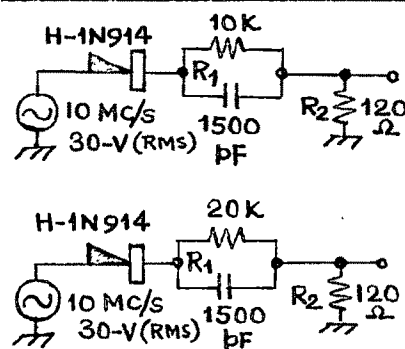
## 9.1 Experimental Detail

The circuit used and 100 Mc/s frequency tially the same as that made in the design was transistor pulse amplifier the harmonic generator.

The satisfactory frequencies from a 10 M an impossible task to a This is because, this n pulses of duration shor An attempt in this dire H-1N914 (of much better Some of the results obt Table 9.1.

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### Driver Network Configuration



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\* These were evaluated waveform. The latter with type 519 Tektror

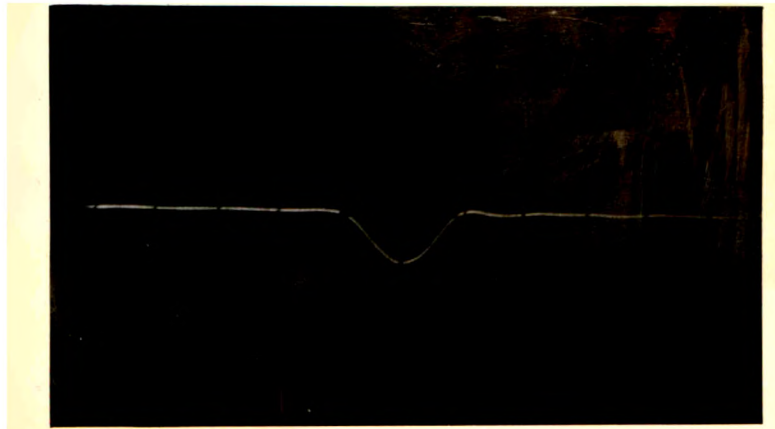


Fig.9.1 Oscillogram of the plate current waveform at the anode of 100 Mc/s multiplier. Time scale is 5 nsec/div.

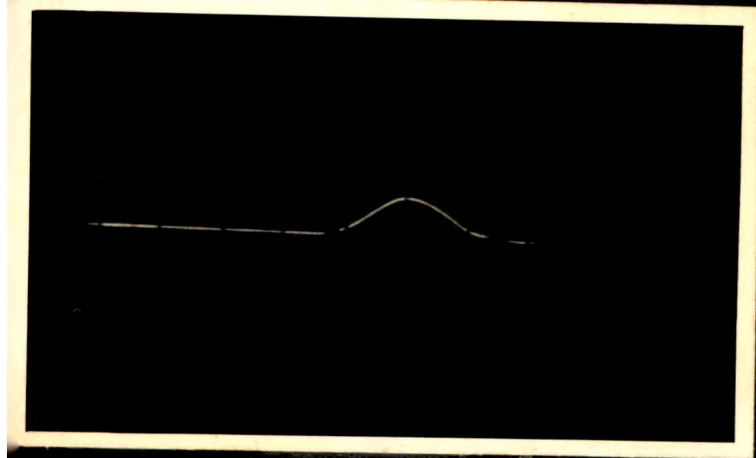
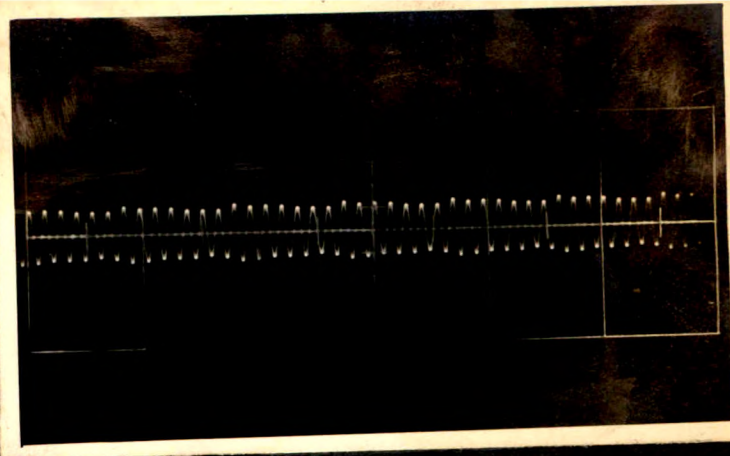


Fig.9.2 Oscillogram of the driver pulse at the control-grid of 100 Mc/s multiplier. Time scale is 5 nsec/div.

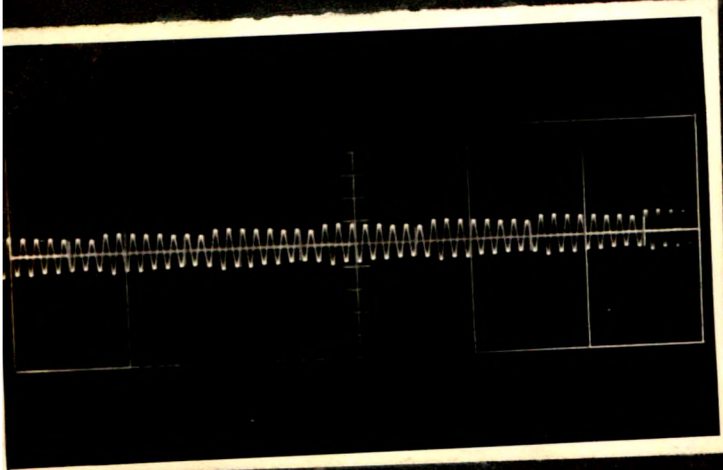
The amplitude of the pulses from the diode clip and hence of the resulting plate current in the multiplier became very small when the pulse duration less than 14 was attempted. Adequate drive for the 6E8 multipliers secured however by amplifying the pulses by a two-stage band transistor pulse amplifier. For a sinusoidal driver 11 volts and  $R_1 = 100 \text{ K}$  and  $R_2 = 60 \text{ } \Omega$  in the diode current pulses of 60 mA amplitude and duration little 10 nsec (see Fig. 9.1) were accomplished. Driver voltage waveshape at the grid of the multiplier tube is shown

The performance of the 6E8 tube as a multiplier is illustrated by the oscillograms of Fig. 9.3. These represent the multiplier outputs at 70, 80 and 90 harmonic frequencies. For a 2 pF, 5K coupling network limiter input, these have been observed to develop signal voltages of 29, 25 and 27 volts at the limiter anode. The limiter output was 10.5 volts. Typical limiter output waveforms <sup>is</sup> ~~are~~ shown in Fig. 9.4.

(a)



(b)



(c)

Fig. 9.3 Oscillograms of the multiplier output at (a) 70 Mc/s, (b) 80 Mc/s and (c) 90 Mc/s harmonic frequencies. Time scales are 100 nsec/cm.

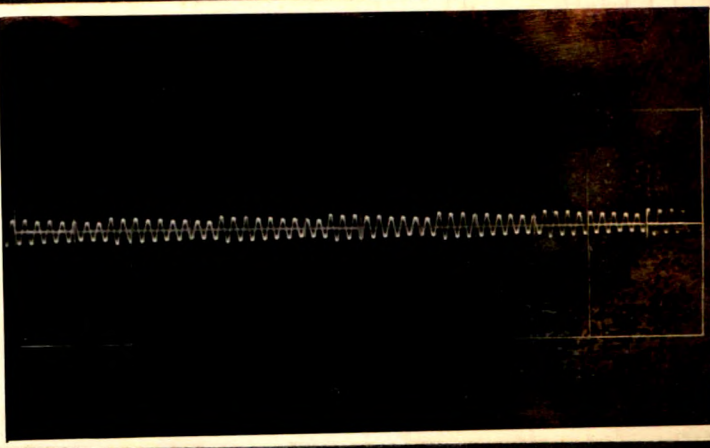


Fig. 9.4 Oscillogram of the limiter 70 Mc/s output waveform.

