



TUBES

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## MODERN HET'RODYNE EXCITER

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**COMPLETE CONSTRUCTION INFORMATION** on a modern hetrodyne-type transmitter exciter covering 3.5 to 30 megacycles is given in this feature article by a well-known G-E HAM NEWS author. The exciter as described has been designed especially for CW operation, but the circuit is easily adapted to single sideband operation with the addition of a direct-frequency-type SSB generator.

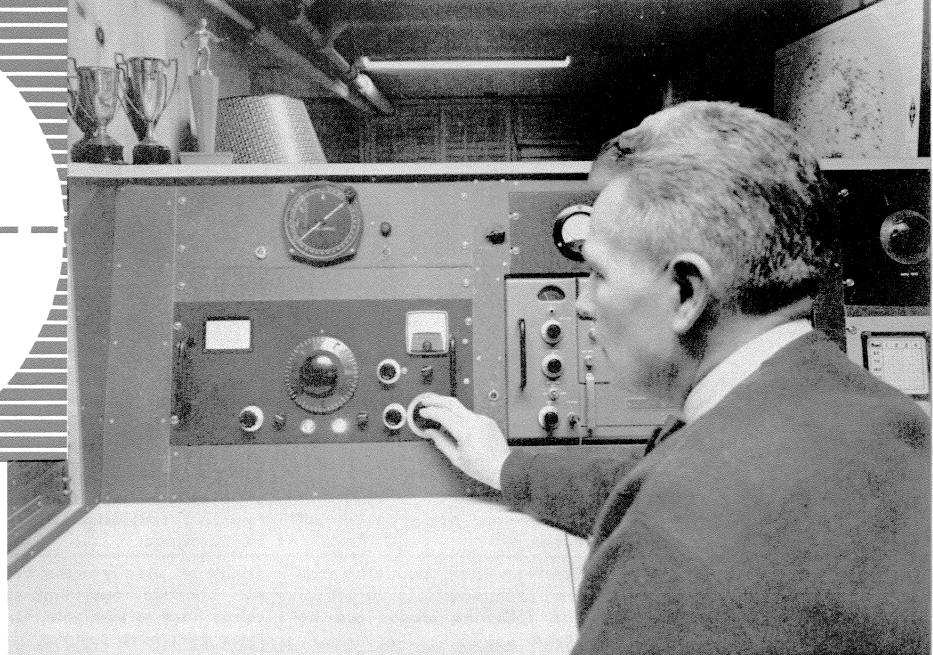
**DESIGN OF AMATEUR TRANSMITTERS** has changed rapidly during the past few years. The hetrodyne principle — featured in better communications receivers for thirty years — is now found in many advanced-design transmitters as well. The result has been new standards of performance at no increase in complexity over older transmitters of several years ago.

The advantages of the hetrodyne-type exciter have been well demonstrated in the many commercially made SSB transmitters on the market. However, the many new features in these equipments create an aura of greater complexity. But the basic hetrodyne-type RF circuit need not be complex; it compares favorably with multiplier-type exciters that are well designed to achieve reasonable frequency stability.

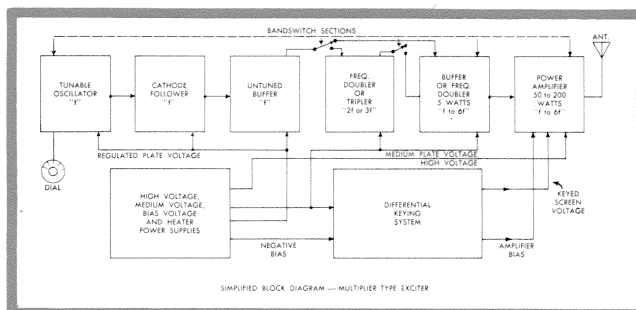
The lineup of a typical multiplier-type exciter is shown in the simplified block diagram of Fig. 1. Note that it has six stages, including isolating stages for the oscillator, frequency multipliers, and power amplifier. The isolation is needed to prevent reaction of the following stages on the oscillator frequency during keying or modulation. Frequency multipliers are needed to place the oscillator at a fraction of the output frequency. Six bandswitch sections are needed to cut the multiplier stages in and out, as well as change coils. The oscillator frequency determining constants also must be switched to provide full dial coverage on all bands.

The hetrodyne exciter, as shown in the simplified block diagram of Fig. 2, has two oscillators, one tunable and covering a single frequency range, and a crystal oscillator on a different frequency for each band. Since neither oscillator frequency is usually harmonically related to the exciter output frequency, they both can operate continuously without putting annoying signals into the station receiver.

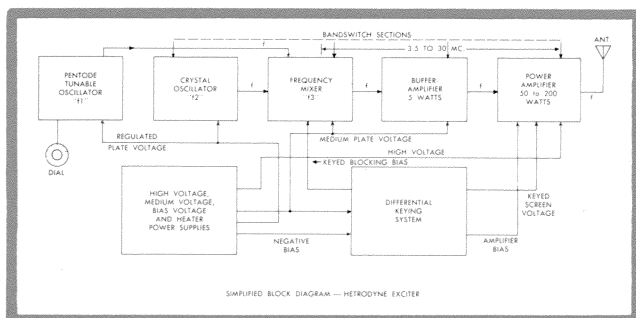
The sum or difference of these two oscillator signal frequencies then becomes a third signal in the mixer stage, (continued on page 2)



**W2FBS TUNES THE POWER AMPLIFIER** on his hetrodyne exciter before going after another "rare one." A confirmed DX-er for many years, W2FBS (Sam) is continuously improving his fine station layout and equipment. Map at upper right has pins indicating the 270-odd countries contacted by W2FBS for DX Century Club credit. Trophies at upper left attest to his bowling prowess. Four separate one-kilowatt power amplifiers, and their power supplies, are housed in two cabinets out of sight at left. Indicator above exciter shows heading of 3-element wide-spaced beam for 14 megacycles.



**FIG. 1. SIMPLIFIED BLOCK DIAGRAM** of a typical bandswitching multiplier-type amateur transmitter/exciter unit. In addition to bandswitches for the coils to cover different bands, switch sections usually are required to change the oscillator frequency coverage for full-dial tuning of each band; and to insert or remove frequency multiplier stages into or out of the circuit, as required.



**FIG. 2. HETRODYNE-TYPE EXCITER** block diagram with tunable oscillator covering a single range, and crystal oscillator both driving mixer stage from which either sum or difference of two mixer input signals is derived in output. Tuning rate of dial is same on all bands.

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