

Collins Transmitters

Sheet 6

Bulletin 200

TYPE 30B MODULATOR

The advantages and economies of Class B modulation have attracted a great deal of attention, but in order to obtain faithful transmission of speech and music using this system, it is absolutely necessary to employ correctly designed circuits and transformers. A great deal of careful development work has been carried out in connection with the design of COLLINS class B equipment. In the course of the work it was discovered that roughness and distortion in Class B equipment of ordinary design was often caused by high frequency transient oscillations which occurred during certain portions of the signal wave. The frequency of these transients was so high that they would not show on the string oscillographs used by other investigators, and although the wave form appeared to be good on a string instrument, transients of a high order were likely to be present and often gave a "rough" or "mushy" character to the modulation. A cathode ray oscillograph (which gives a linear response even on supper audible frequencies) was employed in the design of COLLINS equipment and it was possible to isolate all parasitic oscillations and determine their source as being due to dynatronic properties of the tubes and discontinuities of current flow through the transformer windings. It was also found that the wave form distortion due to transients and other causes was not the same on all audio frequencies, but became more pronounced on certain frequencies when transformers of ordinary design were used. This fact has also led to erroneous conclusions by workers who have measured the wave form distortion of Class B amplifiers at only one frequency (a single run at 200 cycles is customary because of the frequency limitation of ordinary oscillographs).

With an accurate knowledge of the exact behavior of Class B circuits gained by the use of proper testing equipment, it has been possible to design transformers and circuit networks for use with both the 46 and 503A tubes which give practically distortionless modulation. Transient oscillations have been entirely eliminated on all audio frequencies and harmonic distortion has been reduced to a point where it is undetectable by the ear. Specifically, the COLLINS 9C Modulator and 30B Modulator have a uniform response to frequencies of from 80 to 8,000 cycles and have a harmonic distortion of less than 5%. Their fidelity is equal to Class A amplifiers and meets all the requirements of modern broadcast transmitters.

30B Modulator Use — The 30B Unit is capable of 100% modulating Class C R.F. stages, having plate inputs as high as 400 watts. It is used as the modulation unit in the 150B Transmitter, and the 100B Transmitter.

Audio Power Output — 100-200 watts.

Input Impedance — Audio input voltage is obtained from a driving amplifier using two 245's or two 250's in push pull. (Two 250's must be used for full output.) The 30B Unit is linked to the driving amplifier by means of

a three wire low impedance line. A special transformer such as the COLLINS Type CD-15 is used to couple the plates of the 245's or 250's to this line. No input transformer is used on the 30B Unit since the low impedance line is connected directly to the modulator grids which are shunted by a resistance-capacity network.

Output Impedance — Two types of modulation transformers are available as follows:

- (a) 2,500 and 10,000 ohms output for use with two 503A's or two 552's.

- (b) 5,000-6,000 ohms output for use with one 503A.

The output winding is designed to carry the plate current to the modulated amplifier in either case. Specify which output provision is desired when ordering.

Chassis — White nickered steel, 10" x 17 $\frac{1}{8}$ " x 9" high, suitable for relay rack mounting. Plug connectors are provided for power supply, input and output connections.

Price — Less tubes----\$48.50