

The EICO 730 Modulator-Driver Kit

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THE EICO 730 Modulator-Driver Kit will be of interest to amateurs who have constructed either commercial or "home-brewed" c.w. transmitters in the 50 to 100 watt power level, and who would now like to modulate them as economically as possible. The 730 may also be used as a flexible, low-impedance driver for a class B high-power modulator; for a variety of impedances may be matched by the multi-match output transformer including loads between 500 and 10,000 ohms.

A unique over-modulation indicator as well as low-level speech clipping and filtering make the 730 a particularly useful addition to the shack. Two separate inputs accommodate crystal and dynamic microphones, or low impedance devices such as phone patches and tape recorders.

Front panel controls include: GAIN, CLIPPING (level), PLATE (supply) switch, and A.C. switch. A cathode-ray tube, an EM84, functions as the over-modulation indicator, and it too is mounted on the front panel, as is the microphone connector.

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Front view of the Eico 730 Modulator-Driver. The front panel contains, from l to r, Microphone Input, Gain, Clipping Level, Overmodulation Indicator. Plate Supply On-Off, A.C. On-Off. The tube line up from l to r is, 12AX7, 6AL5, 6AN8, GZ34 with the two EL34's to the rear. The transformer on the left is the modulation transformer and the choke in front of it is part of the low pass filter in the clipper circuit.

Circuit

The 730 incorporates five tubes not including the rectifier and over-modulation indicator.

A 12AX7 serves as the microphone pre-amplifier, with the gain control, R_4 , located in the second stage grid circuit. Low frequency attenuation is provided by the small value of C_2 , the interstage coupling capacitor. Phone patch input is available in the cathode of the second half of this stage. With the gain control turned to minimum, the tube operates as a grounded grid amplifier. An r.f. filter, $R_1 C_1$, limits the possibility of r.f. feedback into the modulator.

A 6AL5 serves as a series type clipper with the clipping level controlled by R_9 , which varies the diode plate voltage in a voltage divider network. The output of the clipper is fed to L_1 , C_5 and C_6 , a low pass filter, which suppresses the harmonics generated by the peak clipping action of the diode. The clipper may be adjusted for any desired level of clipping, as indicated on the over-modulation indicator. As a result of this clipping, a higher average level of modulation may be employed without the spurious sidebands and increased bandwidth that would otherwise be present. EICO claims that the effective speech level of the signal is raised 8 to 12 db. There is little doubt that the reports of tremendous audio punch received when using a 75 watt rig modulated with this unit have been due primarily to this clipping action.

A 6AN8 is the actual driver stage in the modulator. The pentode section is the voltage amplifier and is directly coupled to the grid of the triode section which operates as a phase inverter to split the signal before it is fed to the grids of the output stage tubes. Negative feedback from the output transformer secondary to the cathode of the pentode section provides an effective means of stabilizing the performance of the modulator output.

A pair of EL34 audio power amplifier tubes are operated class AB1 in the push-pull output

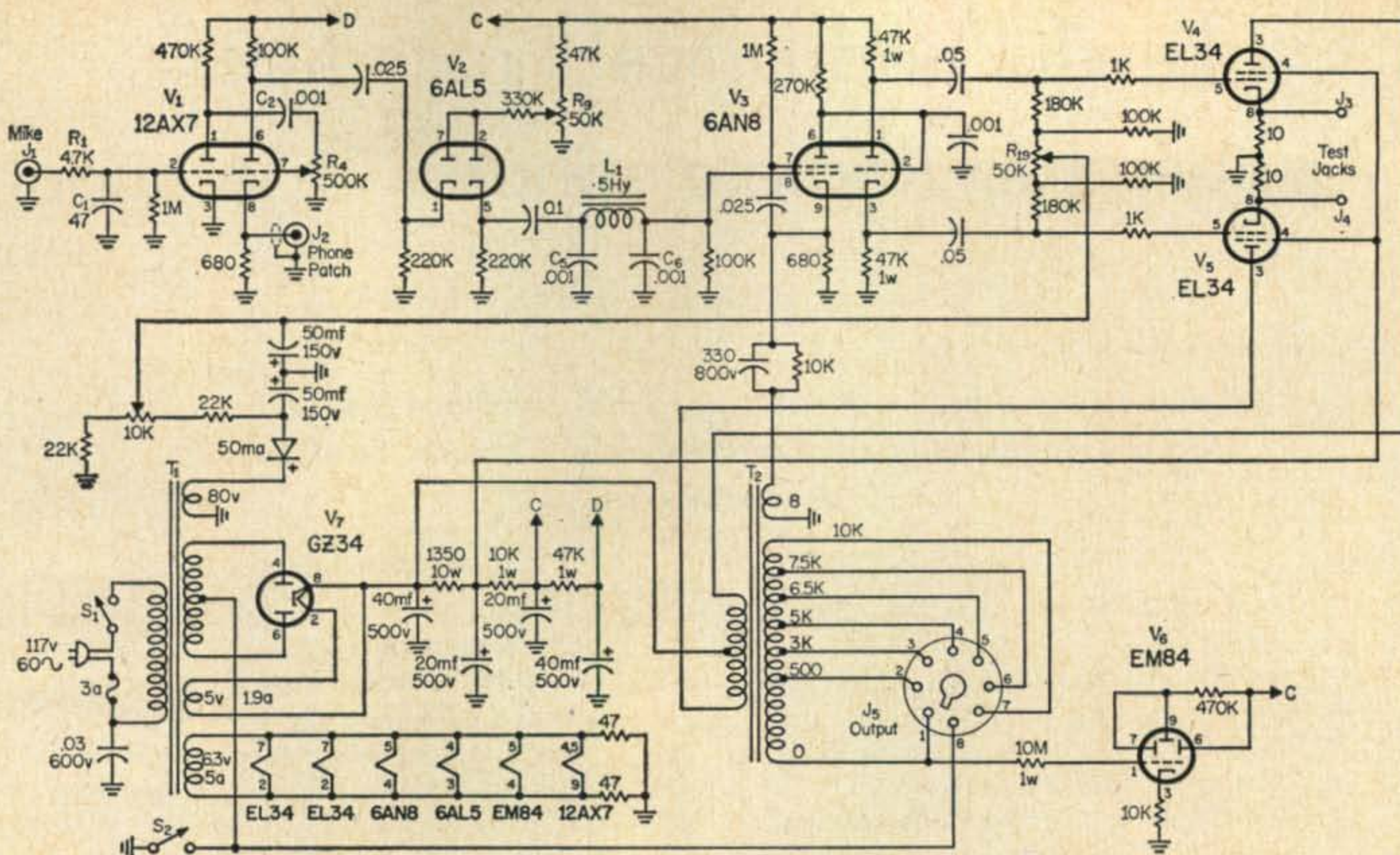


Fig. 1—Circuit of the EICO 730 Modulator-Driver Kit.

stage. Control R_{19} permits the tubes to be electrically balanced by controlling the amount of fixed bias provided by a separate bias supply. The special multi-match modulation transformer features an additional secondary winding which provides the required feedback voltage to the previous stage.

The full wave, capacitor input power supply utilizes a GZ34/5AR4 rectifier tube. The application of high voltage to the modulator may be controlled either by the PLATE supply switch, S_2 , or through the output octal socket on the rear apron by means of a remote set of contacts (perhaps on the antenna change-over relay). A separate selenium bias supply makes available approximately 70 volts of bias for the operation of the output tubes.

The over-modulation indicator is an EM84 cathode-ray tube. When the 730 is used as a modulator this tube indicates when the peak value of the audio output from the modulator exceeds the voltage applied to the r.f. amplifier. The peak value may be adjusted to any desired level by R_9 , the CLIPPING LEVEL control. This potentiometer controls the plate voltage applied to the 6AL5 diode clipper and therefore controls the signal clipping level.

Construction

The 730 is particularly easy to construct and adjust for optimum performance. Well written instructions and six pictorials pave the way for you. It is necessary that you know the plate impedance of the tube or tubes in the rig you wish to modulate so that the correct connection may be made to the modulator output. In the case of a 6146, the 5000 ohm termination at pin 4 of the modulator accessory socket will do nicely.

When you desire to operate c.w. there is one precaution to observe with the 730. The secondary of the modulation transformer should be shorted by means of a s.p.s.t. switch which may be added to the front panel or, alternatively, the power supplied to the r.f. amplifier should be routed some way other than through the secondary. The latter may be accomplished at many transmitters by inserting the octal shorting plug, thereby jumping the plate supply terminals. If this precaution is not observed, the secondary of the modulation transformer attempts to function as a filter choke and it is not capable of handling the inductive requirements of c.w. operation. Several instances of damaged transformers due to this problem have been brought to our attention. This problem has been called to the attention of the manufacturer and it has been suggested that he include this information in the next revision of his instruction manual which accompanies the 730 kit, and that an addendum sheet be provided with the present manual.

On-air reports with the 730 have all been in praise of the excellent audio quality of this modulator. Approximately ten hours of construction time is required to complete the 730 and have it ready for 'phone operation. ■



"... now I'm on the dynamic mike ..."