



Fig. 102. MODEL 530 AMPLIFIER - BLOCK DIAGRAM FOR SIGNAL TRACING

1- 12AX7	Twin Triode	1st Sec. Voltage Amplifier 2nd Sec. Rectifier
1- 6AU6	Pentode	Voltage Amplifier
1- 12AX7	Twin Triode	Phase Inverter
2- 6L6GB	Tetrode	Output
1- 5U4GA	Dual Diode	Full Wave Rectifier

### 3. THEORY OF OPERATION

#### a. Pick-up and Oscillator.

The oscillator section of the 12AU7 (See Fig. 102) operates at approximately 2.5 mc. and is electrically loaded by the coil and vane of the Zenith Cobra pick-up unit which forms the tank component of the oscillator circuit. The vibration of the metal vane, on which the pick-up needle is mounted, varies the resonance of the tank circuit and causes a variable voltage at the plate of the oscillator section of the 12AU7. Accordingly this voltage varies in proportion to the variation of the cutting in the record groove. The pick-up thus performs no work of generating voltage and has no resistance to movement, which reduces record wear to a minimum. The variable voltage at the oscillator plate is filtered by a resistance and capacitance network, eliminating the radio frequency component and passing on to the first voltage amplifier only the desirable audio frequencies (See schematic diagram page 77). This audio signal is

then "high-pass" filtered and applied to the pentode section of the 6AN8 tube for amplification. The amplified signal is developed across a voltage divider where a portion is used for tone compensating feedback, another portion for the automatic level control component, and another portion for the variable resistance section of the 12AU7.

#### b. Automatic Level Control.

Some of the audio voltage is applied to the voltage amplifier section of the 12AX7 where it is amplified and rectified into D.C. voltage, appearing across the time constant circuit at resistor R-25 and the grid of the 12AU7 variable resistance tube. When a high cut record is played this voltage at R-25 will be high. When a low cut record is played this voltage will be low. With this variation of voltage at the grid of the 12AU7, the variable resistance tube automatically regulates the listening level of the record. The audio signal then appears at the cathode follower section of the 6AN8 and is amplified by the 6AU6. With this level control action an even output is maintained regardless of records played.

#### c. Power Amplifier Section.

The power amplifier section uses the tone controlled out-put signal of the 6AU6 as applied to the first section of the 12AX7 phase inverter to drive the 6L6G push-pull out-put stage of the power amplifier. A variable negative feedback loop is provided from the out-put side of the transformer to compensate for various auxiliary speaker loads, in its damping effect