

## CIRCUIT THEORY (Cont.)

where it is heterodyned with the VFO signal. The resultant signal at the desired transmit frequency is amplified by the Driver, V3, and the Power Amplifier, V4. The signal from the VFO Amplifier is initiated in the transistorized VFO/Buffer circuit Q1 and Q2. The signal from the VFO is routed to the VFO Amplifier, and on 40 and 80 meters, is subtractively mixed with the single sideband signal from the IF Amplifier, to result in LSB operation. On 20, 15, and 10 meters, the frequencies are additively mixed, resulting in output on the upper sideband.

When in TRANSMIT, the gain of the First IF Amplifier is controlled through the Automatic Level Control network (using the AGC Amplifier V10) to control the gain of the stage in response to the average input power to the Power Amplifier. This ALC system will compensate for any extremely strong input signals, but does not completely eliminate the necessity of proper adjustment of the Mic. Gain Control. This feature will help prevent the transmitter from flat topping and spurious emissions, but considerable distortion may occur if the Mic. Gain Control is not properly adjusted. Refer to Operating Instructions.

### TUNE AND CW OPERATION

Normally, the frequency of the carrier oscillator is approximately 300 cps outside the 6 db passband of the crystal lattice filter. In TUNE position, the frequency of the carrier oscillator is moved approximately 800 cps to place it well within the passband of the crystal lattice filter. A similar procedure is followed for CW to allow full carrier output during CW operation.

### RECEIVE

In RECEIVE position, or at any time when the transmitter is not in TRANSMIT, all circuits used in transmitting are disabled through the relay controlled circuits, K1. The relay is energized for transmitting and de-energized for receiving. One contact, when de-energized, allows signals from the transmitting tank circuit and antenna to be fed to the Receiver RF Amplifier, V5, where they are amplified and then fed to the control grid of the Receiver Mixer, V6. The local oscillator signal from the VFO Amplifier is now used to heterodyne the received signal to the IF frequency. All IF amplification is accomplished at this frequency, nominally 5500.0 kc, through V7 and V8 IF amplifiers. In the Product Detector V9A, the IF signal is heterodyned with the carrier frequency generated by Carrier Oscillator, Q3. The resultant audio is then amplified by V9B, which then couples to V10, the AGC amplifier, and V11, the output audio stage.

### FREQUENCY CALIBRATION

Frequency calibration of the Model 270B is in 5 kc increments on 80-, 40-, 20-, and 15-meters, and in 20 kc increments on 10 meters. Dial accuracy and tracking are

very good on the 270B, but caution must always be observed when operating near band edges. Measuring the frequency with the 100 kc calibrator when working near band edges is recommended.

### DIAL SET

A dial-set control has been provided so that dial adjustment can be made at any 100 kc point on the dial. With calibrator on, set the dial to any 100 kc point closest to the frequency you wish to work. Now adjust dial-set control to zero-beat the VFO with the 100 kc Calibrator. This provides greater accuracy of dial readout.

### CAUTION

*Care must be exercised when tuning for the 100 kc harmonics of the calibrator. Several spurious image signals may be heard, although they will be definitely weaker than the correct harmonics.*

### TRANSMIT AND RECEIVE SWITCHING

Transmit and receive switching is performed by relay K1. In TRANSMIT position, only those tubes that operate in the transmit mode are operative, all others being biased to cutoff through the relay contacts. In the RECEIVE position, with the relays de-energized, the tubes that are used only in transmit are cut off in the same manner. Relay K1 when de-energized, feeds signals from the output pi-network to the receiver, and is used also to control external switching circuits. In transmit position the meter indicates the cathode current of the power amplifier. In receive position, it indicates the voltage across R703 in the screen grid of the first IF Amplifier, V7, which is inversely proportional to the AGC voltage used to control the gain of the tube. Thus, the meter indicates the relative strength of received signals.

### POWER RATING

The Swan 270B is capable of 180 watts, PEP input under steady state two-tone test conditions. The peak envelope power, when voice modulated, is considerably greater, typically 260 watts, or more.

The built-in power supply produces a no-load plate voltage of approximately 880 volts. Under TUNE conditions, or CW operation, this voltage will drop to approximately 680 volts. Under steady state two-tone modulation, the voltage will drop to approximately 710 volts. If the power amplifier idling current is 30 ma, and the two-tone current, just before flat-topping, is 200 ma, the peak two-tone current will be 300 ma. Under these conditions the PEP input will be 710 volts times 300 ma 213 watts. Under voice modulation, because average power is considerably less, the power amplifier plate and screen voltages will be maintained higher, even during voice peaks, by the power supply filter capacitors. Peak