far to a cathode ray tube in that the electron beam from the cathode is deflected to one output plate or the other by the charge appearing on the deflection plates. The RF energy fed to the control grid of the balanced modulator appears on both plates of the output, in the absence of signals to the deflection plates. The two output plates feed the carrier to Transformer Z1401 in push pull, and the two RF signals cancel each other out in the output of the transformer. The deflection plate reference voltages are adjusted by means of the carrier balance control so that with no audio, the RF being fed to the output plates will cancel out, and the output from Z1401 will be zero. Audio from Microphone Amplifier V16 is superimposed on one deflection plate, thereby unbalancing the modulator, and the two sidebands resulting from the sum and difference frequencies of the audio and carrier appear as a double sideband, suppressed carrier signal in the output of Transformer Z1401. The carrier suppression is approximately 50 db.

The double sideband, suppressed carrier signal is then coupled to the crystal filter, which suppresses one sideband, and permits the other sideband to be fed to the First IF Amplifier, V8. The carrier frequency crystal and the filter crystals are selected so that in the LSB position on 40 and 80 meters, the sideband signal is generated with a carrier frequency of 5172.8 kc, and this signal will fall within the bandpsss of the filter such that the lower sideband will be attenuated by at least 40 db. See Figure 3. On the USE position of 40 and 80 meters, the carrier crystal is 5176.8 kc, which positions the double sideband signal on the other side of the response curve of the filter, attenuating the upper sideband by at least 40 db. In the single conversion mixing process, these sidebands become inverted.

On 20, 15, and 10 meters, where operation is generally on upper sideband, the signal is generated with the same carrier crystal used in generating the lower sideband on 40 and 80 meters. The five crystal filter used in the transceiver results in an improved response characteristic on the low frequency end of the bandpass, and advantage is taken of this effect to provide better sideband suppression on the most used sideband for each frequency band.

The single sideband, suppressed carrier signal from the First IF Amplifier is fed to the Transmitter Mixer, V2, where signals from the VFO Amplifier are mixed, and the resultant signal at the final transmitted frequency is amplified through the Transmitter Mixer, the Driver, V3, and the Power Amplifiers, V4 and V5. The signal from the VFO Amplifier is initiated in the particular Frequency Control Unit being used. The signal from the Frequency Control Unit is routed to the VFO Amplifier, and on 40 and 80 meters, is subtractively mixed with the single sideband signal from the IF Amplifier. On 20, 15, and 10 meters, the frequencies are additively mixed, resulting in output on the opposite sideband.

When in TRANSMIT, the gain of the First IF Amplifier is controlled through the Automatic Limiting Control network D401-402, etc., to control the gain of the stage in response to the average input power to the power amplifiers. 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. Although this feature will prevent the transmitter from flat-topping and spurious emissions, 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 passband of the crystal lattice filter. In TUNE position, to enable the transmitter to be tuned to the maximum power output condition, the frequency of the carrier oscillator is moved approximately 500 cps to place it well within the passband of the crystal lattice filter At the same time, one deflection plate of the balanced modulator is grounded, unbalancing the modulator and allowing full carrier input for tuning purposes. A similar procedure is followed in the CW position of the Phone-CW switch, to allow full carrier output during CW operation. During CW operation the cathode of V16B is opened from ground, cutting off the tube. This allows CW operation with no danger of pickup of audio through an open microphone. Attempts to operate on CW by keying the microphone jack, and inserting carrier, are not recommended.

RECEIVE

In RECEIVE position, or at any time when the transmitter is not in TRANSMIT or STANDBY, all circuits used in transmitting are disabled through the relay controlled circuits, the relays being energized for transmitting, and de-energized for receiving. Relay K2, when de-energized, allows signals from the transmitting tank circuit and antenna to be fed to the Receiver RF Amplifier, V6, where they are amplified, and then fed to the control grid of the Receiver Mixer, V7. The local oscillator signal from the VFO Amplifier is now used to heterodyne the received freq-