When CW reception is desired, a very sharp setting of the selectivity control is desirable. For Single Sideband operation, a setting which produces a slightly wider bandwidth is very effective, and produces remarkable unwanted sideband rejection. A setting which produces a still wider bandwidth is normally desirable for AM reception.

It should be noted that for AM reception, the beat frequency oscillator should be turned off. For single sideband or CW operation, the beat frequency oscillator should be turned on. The beat frequency oscillator is discussed in later sections of this book.

The signal from the Q multiplier — 1st IF amplifier is coupled to the double tuned transformer between the first and second IF amplifier and appears on the second IF amplifier grid.

RF GAIN

The sensitivity of the receiver is adjusted by means of the RF gain control which controls the cathode bias on the RF and 2nd mixer stages. When the control is rotated to its maximum counter-clockwise position, the sensitivity of the receiver will be reduced to the point where no signal can be received. Rotating the control in the clockwise direction will increase sensitivity until maximum is reached at the full clockwise position. The RF gain control may be freely used as a means of sensitivity adjustment as the receiver is tuned from signal to signal or it may be set to maximum sensitivity level and allowed to remain in this position. Adjustment of the RF gain control will have some effect on the "S" meter reading. FOR PROPER INDICATION OF THE "S" METER it is necessary that the RF gain control be advanced to maximum.

The signal from the last IF stage is again coupled through a double tuned transformer which feeds the diode AM detector. The average signal level appearing at this detector is, at all times, proportional to signal input and is used as AGC voltage which is applied to the RF and second mixer stage and, in addition, to the first mixer on the broadcast band only. A positive delay voltage is fed to the AGC bus to provide maximum signal-to-noise-ratio receiving weak signals.

AGC SWITCH

The AGC switch is used to turn the automatic gain control on or off. The automatic gain control is intended for use with AM operation, and is inoperative in other modes of reception. When the AGC switch is turned on, the received signal level is automatically adjusted for a predetermined output and the "S" meter will indicate relative signal level. When the AGC switch is turned off, the "S" meter is disabled and the output of the receiver will vary in accordance with the incoming signal strength.

For single sideband or CW reception, the signal is coupled directly from the plate of the last IF amplifier to the diode AM detector. A grounded cathode Hartley oscillator using the triode section of the Noise Limiter BFO tube is used for BFO injection.

BFO SWITCH — BFO CONTROL

The BFO switch is used to turn the beat frequency oscillator on or off. When the BFO switch is turned off, the beat frequency oscillator is disabled and the BFO control will not function. When the BFO switch is turned on, the S meter is disabled and the AGC circuit is turned off. The BFO control is used to adjust the frequency of the beat frequency oscillator which varies the pitch of the generated audio tone. When receiving single sideband signals, the beat frequency oscillator control should be set in the region marked USB or LSB depending on the desired sideband. It is not normally necessary to detune the beat oscillator from this setting. When receiving CW signals, a mid-position setting of the beat oscillator corresponds to a condition where maximum IF selectivity occurs at zero beat with the incoming signal and no audio tone will be observed at the point of maximum signal reception. It is therefore necessary to detune the beat oscillator control in either direction to provide a suitable audio tone which is comfortable to the operator and to obtain maximum amplitude of the desired beat note. During CW reception, it is often convenient to adjust the beat oscillator to phase an undesired signal to zero beat, thus eliminating it as an audible interfering signal.

The signal from the AM detector is coupled to a series gate automatic noise limiter which is designed to reject all signals exceeding the average modulation level.

ANL SWITCH

The ANL switch turns the automatic noise limiter on or off. The automatic noise limiter will function only when the BFO control is set in off position for AM reception. In normal operation, the noise limiter may be used at will depending on incoming noise level and operating convenience. This Automatic Noise Limiter is intended for use with impulse noise, such as ignition interference or static. It will not appreciably improve performance on continuous, high energy noise such as "hash", thermal or cosmic noise.

The signal from the AM detector and noise limiter is coupled to the first audio amplifier through the audio frequency gain control.

AUDIO GAIN

The audio gain control is used to adjust the speaker or earphone level to comfortable listening volume. It is important not to confuse the function of the audio gain control with the function of the RF gain control which controls the overall receiver sensitivity. Normally, with the RF gain control advanced to provide proper "S" meter reading, all additional variation of listening level is accomplished with the audio gain control. In the event of operation with AGC "OFF", the RF gain control is usually used as the master sensitivity control and the audio gain control is left set in a predetermined position. Proper balance between the two controls under this condition is normally a matter of individual operator preference and operating habits.