

## SECTION III

## INSTALLATION AND OPERATION

## 3.1 INSTALLATION

The VLF receiver is designed for mounting in a standard 19-inch rack. It requires 3.5 inches of vertical space and will project 19.5 inches back into the rack. Adequate ventilation should be provided.

**3.1.1 Power Connection.** - The receiver may be operated from a 115 Vac or 230 Vac primary power source. Before plugging in the unit be sure that the power selector switch on the rear apron is in the correct position for the line voltage to be used. If the proper line voltage does not appear in the switch window, use a screw driver to slide the switch to the correct position. The third pin of the power cord grounds the unit. If a three-pin power receptacle is not available, use the three-to-two pin adapter provided.

**3.1.2 Antenna Connection.** - The input signal to the receiver is applied through rear panel jack A1J1. This is a twinax-type connector. Input impedance is 50 ohms, balanced, or 1000 ohms, balanced. The desired impedance is selected by means of the slide switch next to the input connector.

**3.1.3 Audio Output Connection.** - The balanced 600-ohm audio output from the receiver is obtained at rear-panel jack, J2. This jack is a twinax-type connector.

**3.1.4 Detector Level Output.** - The AM detector output is available at rear-panel jack J1. This jack is a BNC-type connector.

**3.1.5 Local Oscillator Output.** - The output from the receiver's local oscillator is fed to J4, LO OUTPUT. This jack is a BNC-type connector.

**3.1.6 Signal Monitor Output.** - A 2-MHz output for use with a signal monitor is available at the SM OUTPUT jack, J5. This jack is a BNC-type connector.

**3.1.7 IF Output.** - The output of the receiver's IF strip may be obtained at J6, IF OUTPUT. This jack is a BNC-type connector.

## 3.2 OPERATION

The use of the front-panel operating controls is explained in the following paragraphs. These controls are shown in Figure 1-1, a front view of the unit.

**3.2.1 Tuning Control.** - The MAIN TUNING control is used for coarse tuning of the receiver. Approximately thirty-seven turns of the control are required to tune the receiver through its entire frequency range.

**3.2.2 Fine Tuning Control.** - The FINE TUNING control is used for small adjustments to the receiver's tuning.

**3.2.3 Input Attenuator Switch.** - The input attenuator permits the receiver to accept input signals of up to 1-volt rms without overloading. Place the switch in the position which gives the best results.

**3.2.4 IF Bandwidth Switch.** - The IF BANDWIDTH switch is used to select one of the receiver's four IF bandwidths: 150 Hz, 1 kHz, 3 kHz, or 6 kHz. The position to be used depends on the type of signal to be received.

**3.2.5 Audio Bandwidth Switch.** - With the AUDIO BW switch in the NORMAL position, the response of the receiver's audio amplifiers extends from 100 to 7000 Hz. Placing the switch in the NARROW position restricts the response to 825 to 1175 Hz. This switch affects the output both from the front-panel PHONES jack and the balanced 600-ohm output.

**3.2.6 Audio Gain Control.** - The AUDIO GAIN control varies the level only at the PHONES jack. The level of the balanced 600-ohm output is determined by an internal control. The receiver's ac power switch is ganged with this control.

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**3.2.7 BFO Selector Switch.** - This switch is used to select any one of the five internal beat frequency oscillators. The ZERO position is particularly useful for measuring the frequency of an incoming signal. Turn this BFO on and tune the receiver to zero beat the incoming signal. Place the MODE switch in the DECIMAL SHIFT TUNE position and the frequency of the signal is displayed within 10 Hz of the actual frequency. The VAR switch position turns on a variable frequency beat oscillator. Its frequency is varied by means of the BFO FREQ control. The upper sideband (USB) and lower sideband (LSB) oscillators inject signals of the proper frequency to demodulate single sideband signals. These oscillators must be used in conjunction with the 3-kHz IF bandwidth. The oscillator to be used depends on which sideband is transmitted.

**3.2.8 BFO Frequency Control.** - This control is activated when the BFO selector switch is in the VAR position. It permits varying the BFO beat note from 0 to approximately 7 kHz.

**3.2.9 IF Gain Control.** - The IF GAIN control is used to vary the receiver's gain when any of the BFO's are operating, or when the control is moved from the AGC position. Note that the BFO switch must be in the OFF position for the AGC circuit to function.

**3.2.10 Noise Canceller Threshold Control.** - This control determines the threshold level of the noise canceller circuit when moved from the OFF position. The control is in the most sensitive setting when set just past the OFF position. It provides maximum noise suppression at this point.

**3.2.11 Mode Switch.** - The MODE switch determines the scaling factor of the frequency display and sets the receiver for digital automatic frequency control (DAFC) operation, when desired. With the switch in either of the NORMAL DISPLAY positions the last digit of the display indicates the tuned frequency within 100 Hz. If in DAFC and NORMAL DISPLAY, the receiver's local oscillator can be set in 100-Hz increments by means of the DAFC LAST DIGIT switch. Placing the MODE switch in either of the DECIMAL SHIFT positions shifts the decimal point one place to the left so that the last digit now indicates the tuned frequency within 10 Hz. If the receiver is tuned to 100 kHz, or higher, in the DECIMAL SHIFT mode, the initial digit of the frequency disappears and must be mentally added. The DAFC LAST DIGIT switch now locks the receiver to a desired frequency within 10 Hz.

**3.2.12 DAFC Last Digit Switch.** - This switch functions when the MODE switch is in either of the DAFC positions. It sets the last digit of the frequency display and locks the receiver's local oscillator to this digit. When setting the receiver to a frequency in the DAFC mode, first tune as closely as possible to the frequency with the MODE switch in a TUNE position. Then place the MODE switch in a DAFC position, and set the DAFC LAST DIGIT switch to the last digit of the desired frequency. If the receiver is to be retuned when in the DAFC mode to a new frequency which is more than 0.5 kHz from the last frequency, place the MODE switch in a TUNE position, and then reset DAFC as previously described.

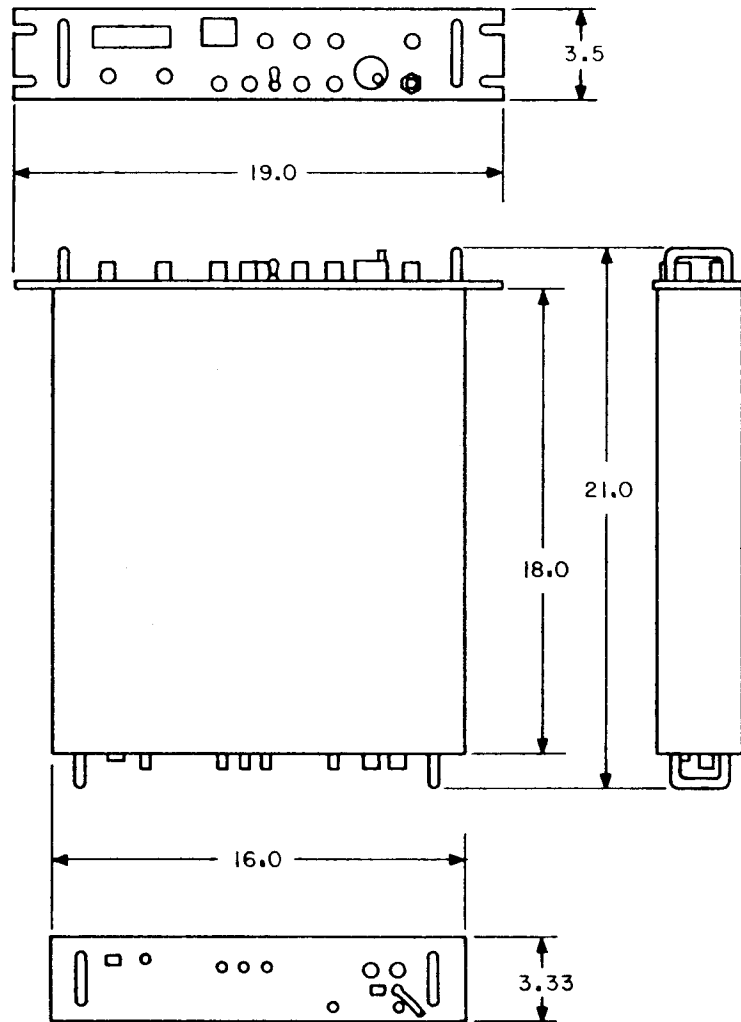


Figure 3-1. Type 357 VLF Receiver, Critical Dimensions