



# *Operating Guide*

Models X960,  
X962, X964, X966  
and X968

FOR YOUR  
**ZENITH**  
**STEREOPHONIC**  
**HIGH FIDELITY**  
**PHONOGRAPH**  
WITH  
**AM-STEREO FM TUNER**

## *There's a World of Entertainment and Pleasure In Your New Zenith Combination*

The magic phrase in sound reproduction today is "Stereophonic High-Fidelity." This method of sound reproduction has created new horizons in home entertainment. This electronic miracle brings to your home the thrilling experience of hearing music reproduced as though the artists are performing right in your home. Zenith Stereophonic High-Fidelity and Stereophonic FM is the culmination of decades of research to create the enchanting illusion of living musical presence. To better understand how this marvel of sound reproduction is accomplished let us first review some of the elementary principles of sound.

As we know, sound travels in waves similar to water waves. Everyone at one time or another has tossed a stone into a body of water and witnessed the expanding ripples that move outward in all directions. A small stone produces small waves and large stones produce large waves.

Sound waves travel in much the same manner. The wave in case of sound is referred to as air vibrations. A low note is one of a few vibrations, whereas, higher notes have more vibrations per second. These sound vibrations are received by us through the ears. The ears in turn transmit these vibrations through the auditory system to the brain, and we are able to hear and distinguish various sounds.

Hearing varies with all individuals. However, for high-fidelity reproduction, the practical human hearing range of sound extends from 30 cycles or vibrations per second, to 15,000 cycles or vibrations per second. It can be readily understood, therefore, that a true Stereophonic High-Fidelity system must faithfully reproduce every sound within this range, free of distortion.

In the past, conventional record players simply did not reproduce vibrations in excess of five or six thousand cycles per second, and the vital low frequencies or vibrations were not faithfully reproduced. It is the extension of the "highs" and the "lows," the brilliant overtones or harmonics that give Stereophonic High-Fidelity music its rich, thrilling, musical presence. But Stereophonic High-Fidelity reproduction does not "just happen." Each component in your instrument is engineered to the highest quality standards. Each component like a link in a chain is dependent upon the performance of the other components to produce true Stereophonic High-Fidelity.

A single channel high-fidelity audio amplifier can be considered a "Monaural" sound system. By this, we mean that the recordings are made by using one microphone or group of microphones and then the information obtained from the orchestra or vocalist is channeled into only one recording. This single channel recording is then fed to a single channel amplifier and to a single speaker system.

Since man basically hears and interprets with what can be considered a "Binaural" mechanism, Zenith's engineering laboratories have developed new "Stereophonic" sound reproduction equipment which is most compatible with the hearing mechanism of man.

In a "Stereophonic" sound system, two microphones or groups of microphones are used and the information from each microphone or group is recorded separately; this is done with either a two channel tape recorder, or with a dual channel stereophonic record. The information from each recorded channel is fed to a separate audio amplifier and then the output of these separate audio amplifiers is fed to separate speaker systems. In this manner, sound can be recorded and reproduced stereophonically and man will hear as he is normally accustomed.

Radio broadcast transmissions are of two types. Amplitude Modulation (Standard-Broadcast) and Frequency Modulation (FM).

Frequency Modulation provides a tremendous improvement in the reduction of interference of static. In most installations, particularly those not too distant from the transmitting station, static of all types is entirely absent.

Frequency Modulation allows the transmission of not only a greatly increased tonal range, resulting in hearing musical instruments and sounds which previously have been unheard, but also of a greatly increased dynamic range, allowing the loudest and softest passages to be heard in their true proportions.

New standards for stereophonic FM broadcasting have been approved by the Federal Communications Commission which will add an exciting new dimension to FM Radio listening. Zenith pioneered and developed the Stereophonic FM system on which the Federal Communications Commission based the broadcasting standards.

The Zenith engineers who created this basic Stereophonic FM system have also created for Zenith owners, new AM/FM tuners which will enable you to receive these new Stereophonic FM broadcasts (sometimes referred to as Multiplexing).

The stereophonic FM tuner in this model can be used to obtain the new full dimension Stereophonic FM broadcasts.

A dual professional type "Stereophonic Cartridge" is provided to insure complete listening satisfaction for the new High-Fidelity LP records, as well as the new Stereophonic records, and ordinary shellac records. This "Dual Stereophonic" cartridge (Part No. 142-151) is a sensitive lead zirconate constant amplitude type cartridge. It has two styli, a .7 mil diamond for LP records and a 3 mil manufactured sapphire for 78 R.P.M. records. This cartridge is compatible in that it will not only play Stereophonic records but also standard Monaural records.

These Models all have an eight speaker system. Two 15 inch woofers, two exponential horn tweeters and four 3½ inch cone tweeters.

The "tweeter speakers," reproduce the higher, more rapidly pulsating tones, while the large speakers, the "woofers," reproduce the lower slower pulsating tones.

As these Models are designed and manufactured, they feature a Stereophonic Cartridge, a Four Speed Record Changer, an AM-Stereophonic FM tuner, dual audio amplifiers for stereophonic sound, a dual speaker system, and provisions for an extension speaker system.

## General

### POWER SUPPLY AND OUTPUT

Your Zenith amplifier, automatic record player and FM-AM Tuner are designed for operation on 110 to 125 volts, 60 cycle alternating current, AC.

*Do not attempt to operate on direct current (DC), or damage will result.*

If you are not certain of the voltage or frequency in cycles of your electricity, check with the electric company.

If hum is apparent when operating the receiver, it may be reduced or eliminated by reversing the plug in the wall socket.

Power consumption of the amplifier, record changer and tuner is 125 watts. The EIA power output of the amplifier is 160 watts. This power output means that you have ample reserve above the requirements for any ordinary needs.

### UNPACKING INSTRUCTIONS (See Fig. 1)

1. Remove the tie down strips on record pressure arm. Lift record pressure arm and move to right.
2. Remove the tie down strips on tone arm and move to right.
3. Remove two red shipping bolts and red motor shipping bolt.
4. Remove shipping material.
5. Rotate turntable support plate approximately 45°. Remove the drive pulley packing strip and be careful not to move the rubber drive belt out of position.
6. Float the changer by turning the two base plate mounting bolts clockwise until they are flush with the changer base plate.

7. Remove cartridge shipping strip, by pulling it off the tone arm, in the direction of the arrow.

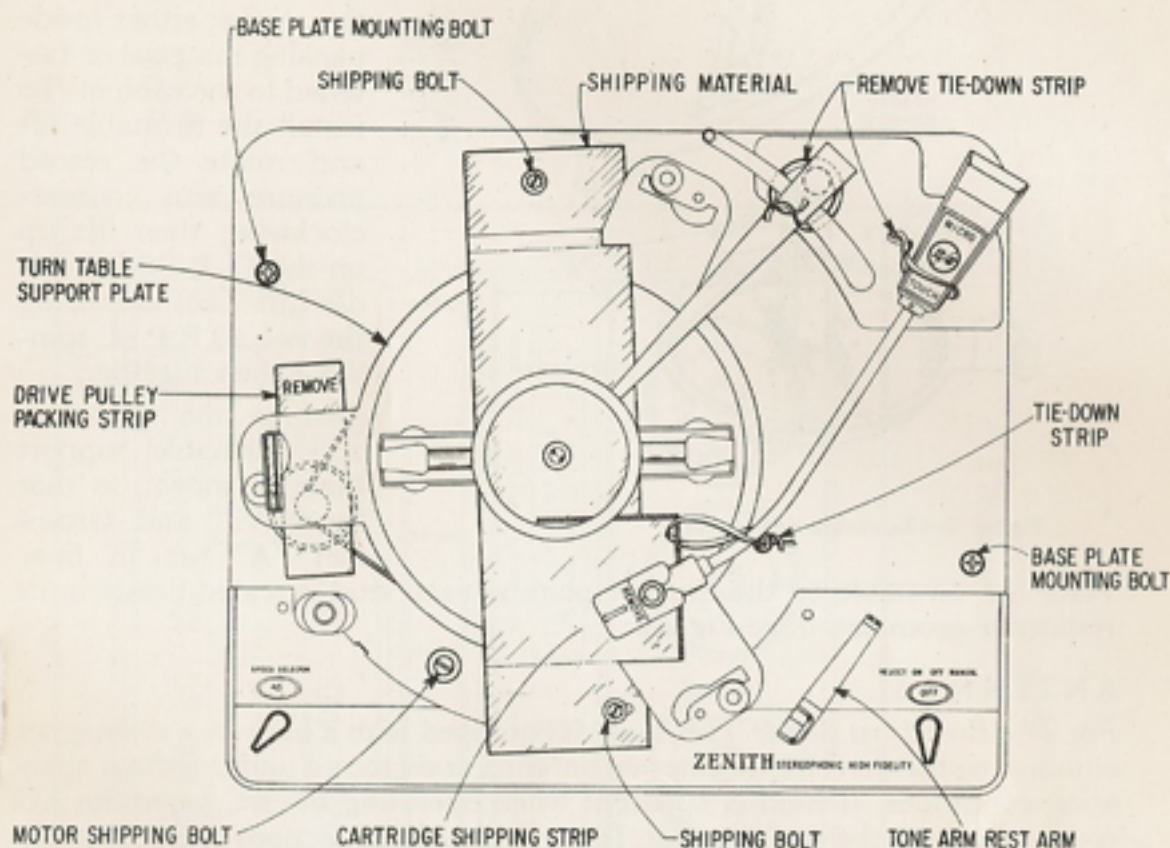
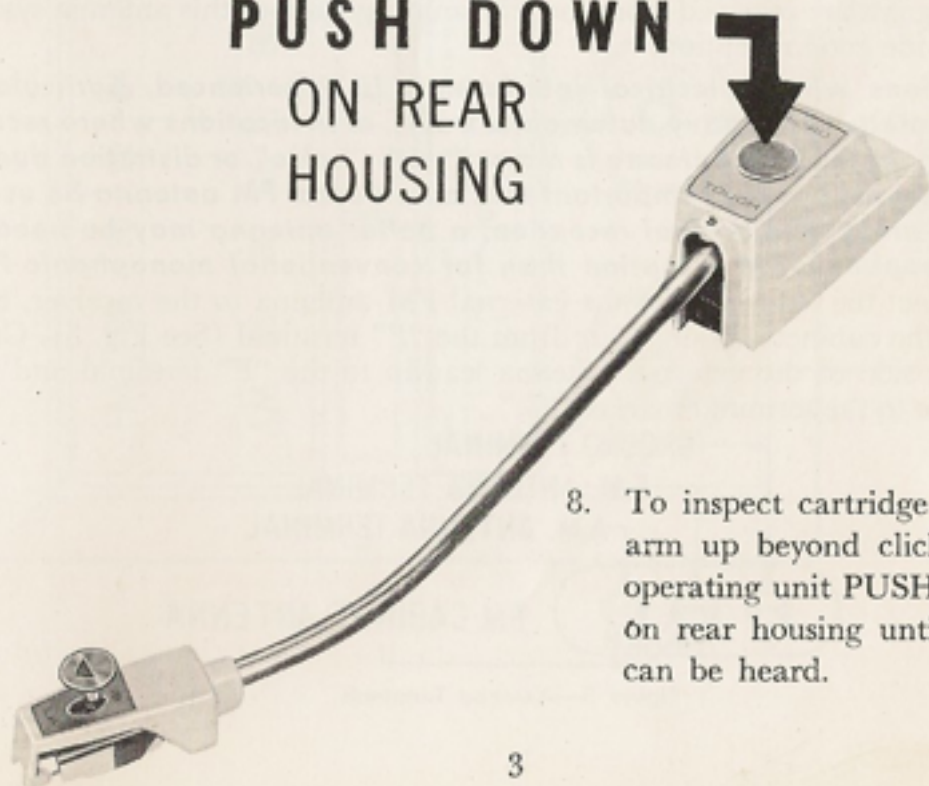


Figure 1—Unpacking

**PUSH DOWN  
ON REAR  
HOUSING**



8. To inspect cartridge lift tone arm up beyond click. Before operating unit PUSH DOWN on rear housing until a click can be heard.

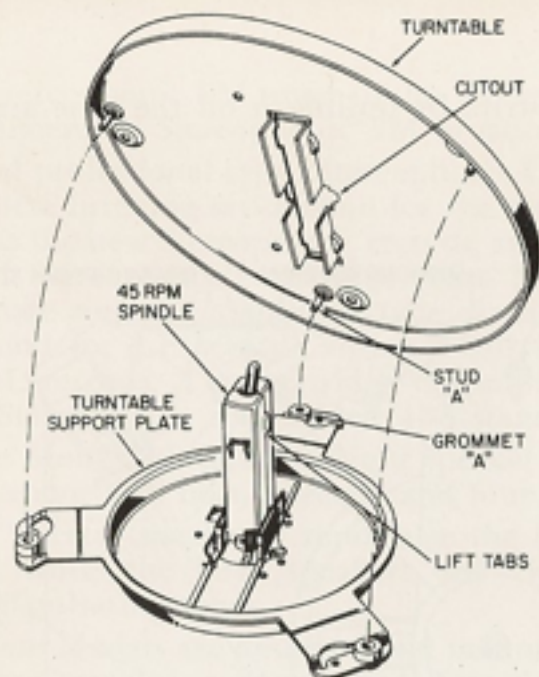


Figure 2—Turntable Installation

Place the turntable on the support plate so each stud is seated firmly in its respective grommet. (See Fig. 2).

## ANTENNAS

*For The Broadcast Band:* This tuner is equipped with a built-in wavemagnet eliminating the need for an external antenna and ground under normal operating conditions. If hum is apparent when operating the set, move the AC cord away from the wavemagnet. In rural or isolated sections of the country, the addition of an antenna from 25-100 feet long is recommended. Connect it to the AM antenna terminal.

*For Frequency Modulation:* The special built-in Cabinet Antenna is designed for Frequency Modulation reception and in average locations where fairly strong signals are received from the transmitting station, this antenna system will provide good reception.

*In locations where electrical interference is experienced, particularly close to areas with heavy automobile traffic, or in locations where reception with the built-in antenna is marred with "noise" or distortion due to weak signals, it is very important that an external FM antenna be used. Also, in areas of marginal reception, a better antenna may be needed for stereophonic FM reception than for conventional monophonic FM.* To connect the lead-in from the external FM antenna to the receiver, first remove the cabinet antenna wire from the "F" terminal (See Fig. 3). Connect one side of the external antenna lead-in to the "F" terminal and the other side to the terminal marked "G."

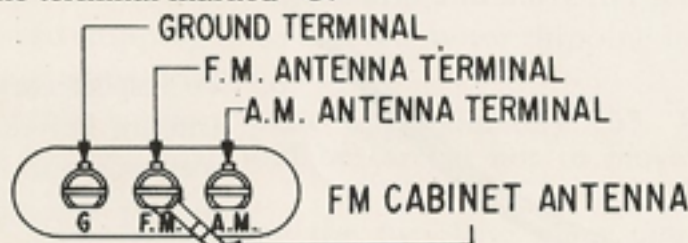


Figure 3—Antenna Terminals

- The turntable is packed in some other portion of the carton, either inside packing material or fastened to the cabinet. To install the turntable lift and rotate the record pressure arm counter-clockwise; then lift up on the 45 R.P.M. Spindle Lift Tabs and bring the two 45 R.P.M. spindle halves together.

Position the turntable and turntable support plate as shown, so that Stud "A" and Grommet "A" are in line.

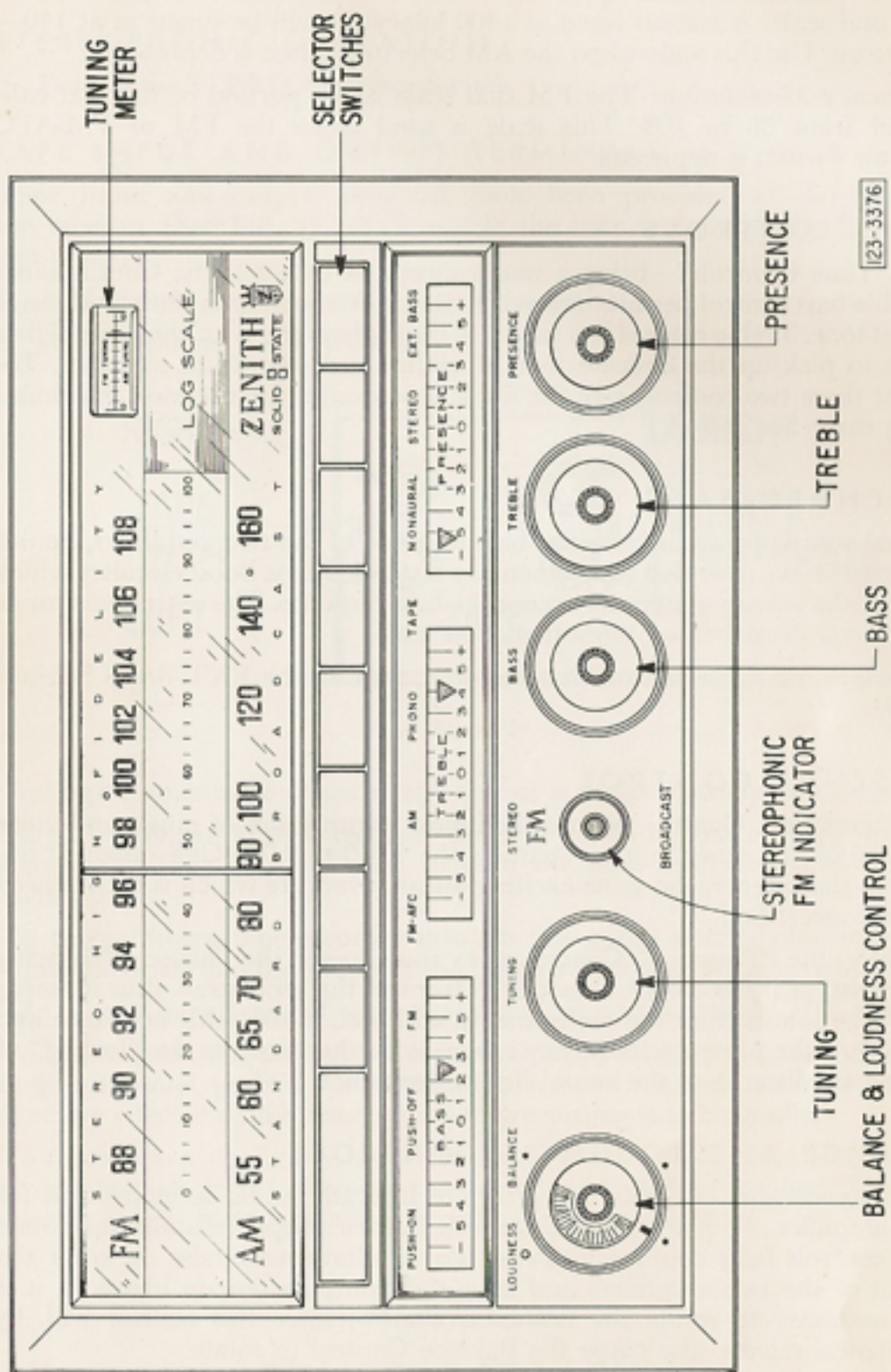


Figure 4—Control Panel

## DIAL CALIBRATION

*Broadcast Band:* The broadcast dial scale is the portion calibrated from 55 to 160. A station listed as operating on 550 kilocycles will be found at 55 on your dial scale. A station listed at 1400 kilocycles will be tuned in at 140—and so on. Use this scale when the AM Selector Switch is depressed.

*Frequency Modulation:* The FM dial scale is the portion of the dial calibrated from 88 to 108. This scale is used when the FM or FM-AFC Selector Switch is depressed.

## TONE CONTROLS

The "Tone Controls"—bring a new concept to tone quality. Continuously variable bass control permits desired emphasis or lows within the broad range of bass tone. Treble control lets you vary the highs along with the wide higher range to pick up the delicate tone of violins and coloratura sopranos. Together these two controls give the finest tone quality for the most discriminating ear. (See Fig. 4.)

## EXTENDED BASS

Should you desire to increase the bass response of the two amplifiers, Zenith Engineers have provided supplementary Extended Bass Boost circuitry which enables the user to materially accent the bass response. The entire Bass range takes on a deeper more vibrant mellow tone.

To obtain the more vibrant bass response, push in the EXT BASS Selector Switch.

## PRESENCE CONTROL

The "Presence" Control permits the fullest transmission of music and voice in the vital "presence" range—namely the 4,000 to 8,000 CPS range. It imparts to the listener, the same exciting aural adventure which is experienced in the concert hall.

Actually, the "Presence" Control gives the listener the illusion of hearing the soloist, as if the soloist were out in front of the orchestra—thus it "separates" the soloist from the orchestra. In addition, it also adds brilliance and richness to the presence frequency range, to further develop the "feeling" of placing the listener at the actual live performance.

## BALANCE AND LOUDNESS CONTROLS

The Balance and Loudness Controls are basically audio level controls for each amplifier. To place the two controls in their proper relationship, rotate both controls fully counterclockwise. To simultaneously raise or lower the output of the two amplifiers and have their outputs remain identical, it is only necessary to rotate the Loudness Control since this control will, by mechanical means, also cause the Balance Control to rotate.

Should you desire to balance the output of the amplifiers even more closely, push in the MONAURAL Selector Switch, hold the Loudness Control firmly so it cannot move, and rotate the Balance Control until the sound appears to come from a point midway between the two speaker systems.

## MONAURAL OPERATION

1. Push-in the MONAURAL Selector Switch (See Fig. 4.)

## STEREOPHONIC OPERATION

1. Push in the STEREO Selector Switch.

## TAPE INPUT AND OUTPUT TERMINALS

Tape input and output terminals have been provided at the back of the receiver (See Fig. 5) which enable the user to connect the following equipment:

1. A Monaural Tape Recorder
2. A Stereophonic Tape Recorder

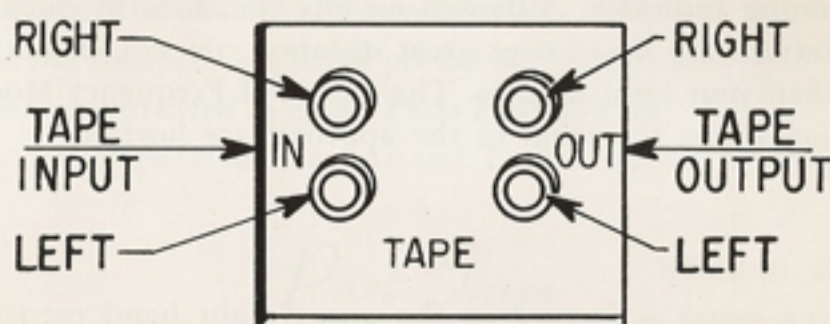


Figure 5

The input impedance of each tape circuit is approximately two megohms.

To play a monaural tape recorder through the audio system, plug into the right input terminal, and push in both the tape and monaural Selector Switches.

To play a Stereo tape recorder through this audio system, plug into both input terminals and push in both the tape and stereo selector switches.

The output impedance of each tape circuit is approximately 10K ohms.

To record from this unit with a monaural tape recorder, plug into the right output terminal, push in the monaural selector switch and push in whatever function selector switch from which the recording is to be made.

To record from this unit with a stereo tape recorder plug into both output terminals, push in the stereo selector switch and push in whatever function selector switch from which the recording is to be made.

## *Part One*

## TUNER OPERATION

*Broadcast Band:* Figure 4 shows the position of the Control knobs. To place the instrument in operation, push in the PUSH ON Selector Switch. Push in the AM Selector Switch.

To tune the receiver, turn the Tuning Control knob slowly to the desired station, being guided by the tuning indicator, and readjust the Loudness Control knob to the right or left for the desired volume. To turn the receiver OFF, push in on the PUSH OFF Selector Switch. (See Fig. 4.)

*Frequency Modulation:* The receiver is turned ON and OFF in the same manner as in broadcast operation. Push in the FM Selector Switch. Tuning the receiver on the Frequency Modulation band will require more care than on the broadcast band. A hissing sound may be noted when tuning between Frequency Modulation stations. This is normal, and will disappear as the station is tuned in. After a station is located, the pointer should be moved back and forth until the point of quietest reception and best tonal quality is found. Correct tuning is indicated by the Tuning Indicator. Although on rare occasions Frequency Modulation stations are heard over great distances, do not expect to tune in other than your local stations. The nature of Frequency Modulation transmission limits reception to the approximate horizon.

## TUNING METER

This tuning meter is located in the upper right hand corner of the control panel. Correct tuning is indicated by obtaining maximum deflection on the meter. The strongest station will produce the greatest indication on the meter.

## STEREOPHONIC FM INDICATOR

When the FM station to which you are tuned is transmitting stereophonically, the Stereophonic Indicator on the Tuner control panel (See Fig. 4) will light up indicating the tuner is receiving a stereophonic program. Should you tune to a monaural FM program the Indicator will not light up, indicating the receiver is operating monaurally and receiving a monaural program.

For Stereophonic FM operation, push in the STEREO Selector Switch.

## AUTOMATIC FREQUENCY CONTROL (FM-AFC)

This receiver features an automatic frequency control which automatically keeps your receiver on the exact station frequency when you are tuned to an FM station. To utilize this feature tune the receiver as instructed under "Frequency Modulation" and then push in the FM-AFC Selector Switch.

When tuning to another FM station, always push in the FM Selector Switch, retune as instructed under "Frequency Modulation" and then push in the FM-AFC Selector Switch.

When the desired FM station is a weak station, adjacent in frequency to a strong station, the AFC may pull the tuning into the stronger station. Under these conditions, push in the FM Selector Switch and tune the receiver as instructed under "*Frequency Modulation.*"

## *Part Two*

### MONAURAL PHONO OPERATION

1. Push in the PHONO Selector Switch. (See Fig. 4.)
2. Push in the MONAURAL Selector Switch.
3. Adjust the Balance Control as previously instructed.
4. Proceed as instructed in either Parts Four or Five.
5. Adjust Loudness, Bass, Presence and Treble controls as desired.

## *Part Three*

### STEREOPHONIC PHONO OPERATION

1. Push in the PHONO Selector Switch (See Fig. 4.)
2. Push in the STEREO Selector Switch.
3. Proceed as instructed in either Parts Four or Five.
4. Adjust Loudness, Bass, Presence and Treble controls as desired.

## *Part Four*

### AUTOMATIC PHONO OPERATION

NOTE: If the ON-OFF Switch on the control panel is placed in OFF position and the record changer is turned on with the ON-OFF Reject Switch, then the complete unit will be turned off after the last record has been played.

1. Push in the PHONO Selector Switch. (See Fig. 4.)
2. Lift and rotate the record pressure arm counterclockwise. Place records on spindle, and place record pressure arm on top of records.
3. Rotate the speed selector knob to 78, 45, 33 or 16 R.P.M. as shown at the speed indicator. This will be determined by the speed of the records being used. (See Fig. 7).

4. To rotate the stylus selector to either "78" or "LP" position, place the tone arm onto the tone arm rest, push the stylus selector down and rotate 180° (See Fig. 6). The choice will be determined by the type record being played.
5. Turn the Reject-On-Off-Manual switch on the changer to reject and release it. The changer will automatically play all records on the spindle. After the last record is played the tone arm returns to the rest and the motor shuts off.
6. Adjust loudness control to desired level.

This unit will automatically play a stack of eight 78 R.P.M., ten 45 R.P.M., ten 33 $\frac{1}{3}$  R.P.M. or ten 16 $\frac{2}{3}$  R.P.M. records.



Figure 6—Stylus Selector

## *Part Five*

### MANUAL PHONO OPERATION

1. Lift and rotate the record pressure arm counterclockwise (See Fig. 7).
2. Place a record over the spindle and then down to the turntable.
3. Rotate the speed selector knob to 78, 45, 33 or 16 R.P.M. as shown at the speed indicator. This will be determined by the speed of the records being used.
4. To rotate the stylus selector to either "78" or "LP" position, place the tone arm onto the tone arm rest, push the stylus selector down and rotate 180° (see Fig. 6). The choice will be determined by the type record being played.

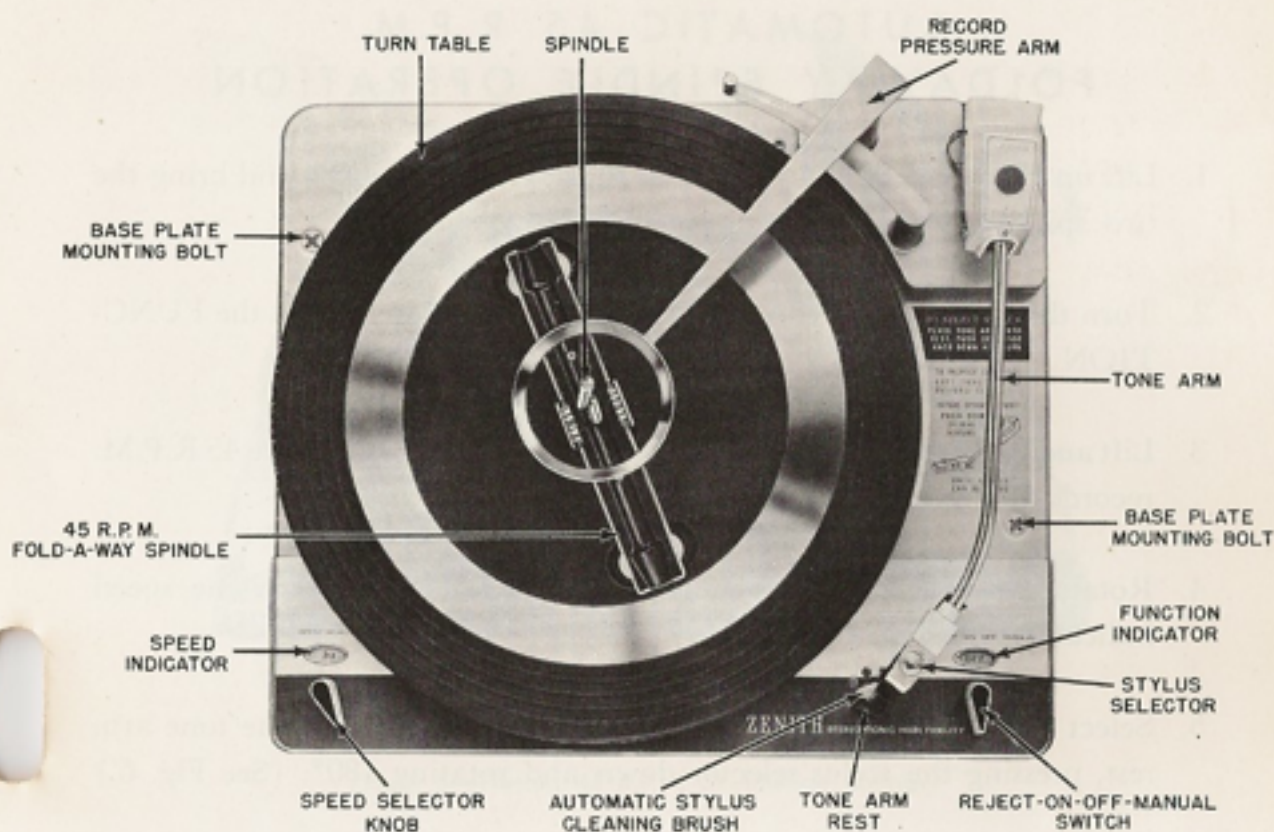


Figure 7—Changer, Top View

5. Turn the Reject-On-Off-Manual switch until Manual appears at the FUNCTION INDICATOR. This will turn on the record changer.
6. Pick up the tone arm and place it on the record.

## TURNING THE CHANGER OFF

1. Lift the tone arm and place it on the tone arm rest.
2. Turn the Reject-On-Off-Manual switch to Off position.

## *Part Six*

### AUTOMATIC 45 R.P.M. FOLDAWAY SPINDLE OPERATION

1. Lift up on the 45 R.P.M. spindle as illustrated in Figure 8 and bring the two spindle halves together.
2. Turn the Reject-On-Off-Manual switch until On appears at the FUNCTION INDICATOR. This will turn on the record changer.
3. Lift and rotate the record pressure arm counterclockwise. Place 45 R.P.M. records on spindle. (See Fig. 9.)
4. Rotate the speed selector knob to 45 R.P.M. as shown at the speed indicator. (See Fig. 7.)
5. Select "LP" stylus position by placing the tone arm onto the tone arm rest, pressing the stylus selector down and rotating 180°. (See Fig. 6.)
6. Turn the Reject-On-Off-Manual switch on the changer to Reject and release it. The changer will automatically play all records on the spindle. After the last record is played the tone arm returns to the rest and the motor shuts off.
7. Adjust loudness control to desired level.

This unit will automatically play a stack of ten 45 R.P.M. records.

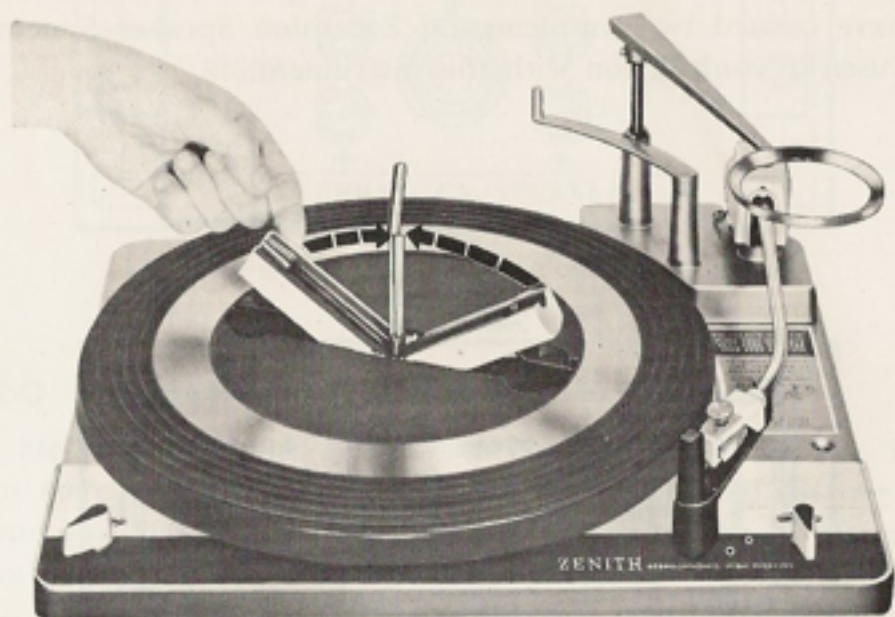


Figure 8—Placing 45 R.P.M. Spindle on Changer

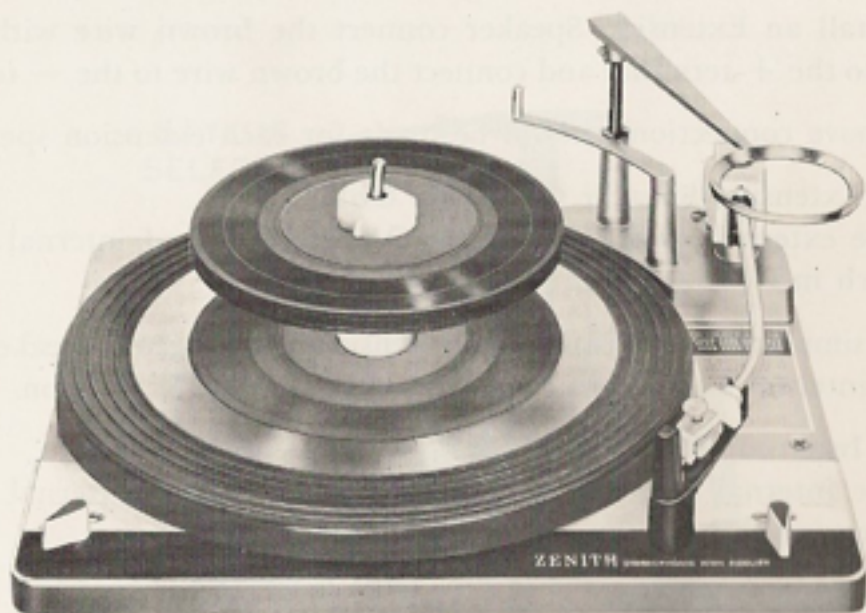


Figure 9—45 R.P.M. Spindle Installed on Changer

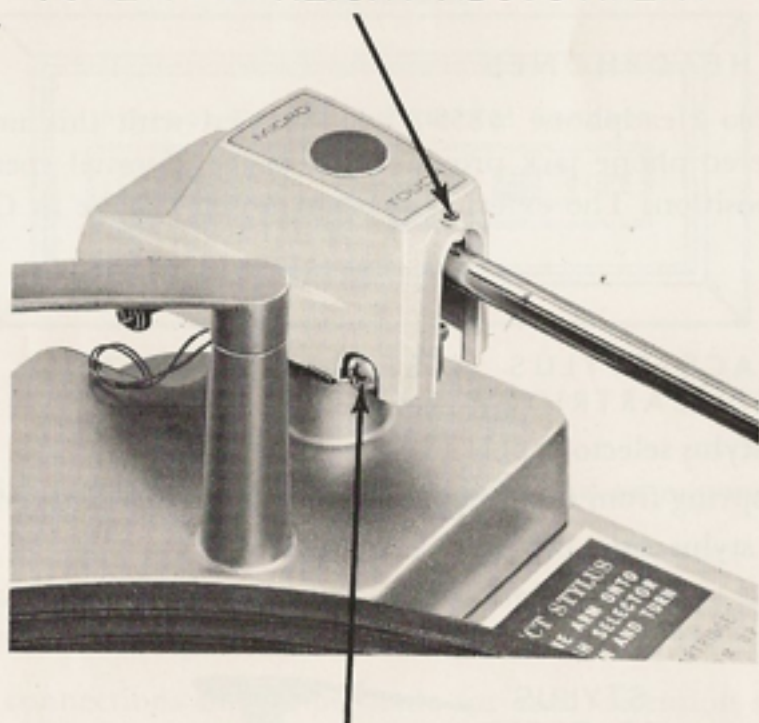
## TONE ARM HEIGHT ADJUSTMENT

The tone arm height is adjusted by means of the height adjustment screw.

To raise the tone arm turn this screw counterclockwise. To lower the tone arm turn the screw clockwise.

The tone arm must be adjusted so that the stylus contacts the stylus cleaning brush in such a manner that it does not move the cartridge assembly during cleaning.

## TONE ARM HEIGHT ADJUSTMENT



## TONE ARM SET-DOWN ADJUSTMENT

### TONE ARM SET-DOWN ADJUSTMENT

This ruggedly built changer has been carefully tested and adjusted; however, it may be necessary to adjust the tone arm set-down position. If the needle falls off the record, lift the tone arm, and turn index screw on the tone arm support a small amount until the needle lands in the correct position.

## Warranty

Zenith Radio Corporation warrants the parts, transistors and tubes in any Zenith radio receiver, phonograph, high fidelity and stereophonic instrument, including combinations of all of the foregoing (with the exception of batteries) to be free from defects in material arising from normal usage. Its obligation under this warranty is limited to replacing, or at its option repairing any such parts, transistors or tubes of the receiver which, after regular installation and under normal usage and service, shall be returned within ninety (90) days from the date of original consumer purchase of the receiver to the authorized dealer from whom the purchase was made and which shall be found to have been thus defective in accordance with the policies established by Zenith Radio Corporation.

The obligation of Zenith Radio Corporation does not include either the making or the furnishing of any labor in connection with the installation of such repaired or replacement parts, transistors or tubes nor does it include responsibility for any transportation expense.

Zenith Radio Corporation assumes no liability for failure to perform or delay in performing its obligations with respect to the above warranty if such failure or delay results, directly or indirectly, from any cause beyond its control including but not limited to acts of God, acts of government, floods, fires, shortage of materials, and labor and/or transportation difficulties.

### CONDITIONS AND EXCLUSIONS

This warranty is expressly in lieu of all other agreements and warranties, expressed or implied, and Zenith Radio Corporation does not authorize any person to assume for it the obligations contained in this warranty and neither assumes nor authorizes any representative or other person to assume for it any other liability in connection with such Zenith radio receivers, phonographs, high fidelity and stereophonic instruments or parts, transistors or tubes thereof.

The warranty herein extends only to the original consumer purchaser and is not assignable or transferable and shall not apply to any receiver or parts, transistors or tubes thereof which have been repaired or replaced by anyone else other than an authorized Zenith dealer, service contractor or distributor, or which have been subject to alteration, misuse, negligence or accident, or to the parts, transistors or tubes of any receiver which have had the serial number or name altered, defaced or removed.



## ZENITH RADIO CORPORATION

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