OPERATING INSTRUCTIONS

THE FISHER®

450-T™

Stereophonic AM-FM Receiver

WORLD LEADER IN HIGH QUALITY STEREO

CONGRATULATIONS!

With your purchase of a FISHER instrument you have completed a chain of events that began many months ago, in our research laboratories. For it is there that the basic concept of the equipment you have just acquired came into being—its apearance, its functions, its quality of performance, its convenience of use.

But the end step—your purchase—is merely a beginning. A door has now opened, for you and your family, on virtually unlimited years of musical enjoyment. Recognizing that one of the keys to pleasurable ownership is reliability, we have designed this instrument to give long and trouble-free service.

Remember always that we want this equipment to give you the best performance of which it is capable. Should you at any time need our assistance toward that objective, please write me personally.

AN IMPORTANT SUGGESTION

Many hours have been spent by our engineers and technical writers to create this instruction book for your guidance and enjoyment. If you want the **most** out of your FISHER, there is only one way to obtain it. With the equipment before you, please read this booklet carefully. It will be time well spent!

Avery Fisher

Founder and President

FISHER FIRSTS

Milestones In the History of High Fidelity Reproduction

1937 First high-fidelity sound systems featuring a beam-power amplifier, inverse feedback, acoustic speaker compartments (infinite baffle and bass reflex) and magnetic cartridges.

1937 First exclusively high-fidelity TRF tuner, featuring broad-tuning 20-20,000 cycle fidelity.

1937 First two-unit high-fidelity system with separate speaker enclosure.

1938 First coaxial speaker system.

1938 First high-fidelity tuner with amplified AVC.

1939 First dynamic range expander.

1939 First 3-way speaker in a high-fidelity system.

1939 First center-of-channel tuning indicator.

1945 First preamplifier-equalizer with selective phonograph equalization.

1948 First dynamic range expander with feedback.

1949 First FM-AM tuner with variable AFC.

1952 First 50-watt all-triode amplifier.

1952 First self-powered master audio control.

1953 First self-powered, electronic sharp-cutoff filter system for high-fidelity use.

1953 First universal horn-type speaker enclosure for any room location and any speaker.

1953 First FM-AM receiver with a cascode front end.

1954 First low-cost electronic mixer-fader.

1954 First moderately priced professional FM tuner with two meters.

1955 First peak power indicator in high fidelity.

1955 First master audio control chassis with five-position mixing facilities.

1955 First correctly equalized, direct tape-head preamplifier with self-powered master audio control.

1956 First all-transistor preamplifier-equalizer.

1956 First dual dynamic limiters in an FM tuner for home use.

1956 First performance monitor in a high-quality amplifier.

1957 First GOLDEN CASCODE FM tuner.

1957 First MicroRay tuning indicator.

1958 First stereophonic radio-phonograph with magnetic stereo cartridge.

1959 First high-quality remote control system.

1959 First complete stereophonic FM-AM receiver.

1959 First high-compliance plus high-efficiency Free-Piston loudspeaker system.

1960 First to use MicroRay for FM tuning and as a recording audio level indicator.

1960 Smithsonian Institution, Washington, D. C., receives for its collection America's first commercially manufactured high-fidelity radio-phonograph, made by Avery Fisher in 1937.

1960 First reverberation device for use in high fidelity equipment—the Fisher Dynamic Spacexpander®.

1960 First stereo tuner with MicroTune®.

1961 First FM-Stereo multiplex adapter with STEREO BEACON® and automatic mono-stereo switching.

1961 First complete FM-multiplex stereo receivers.

1961 First FM-stereo tuners with STEREO BEACON® and STEREO BEAM.

1961 First internal switching system to permit immediate tape playback with use of all controls and switches.

1962 First woofer with eddy-current-damped voice coil.

1963 First power amplifier to use oscilloscope-type frequency-compensated input circuit.

1964 First FM Stereo Tuner with STEREOSCAN®.

1964 First peripherally-driven tweeter with soft dome.

1964 First FM tuner with TUNE-O-MATIC® circuitry.

1965 First All-in-One, All-Transistor 4-Gang Front-End.

1966 First F.E.T. front-end design with over 40 db of Automatic Gain Control.

1966 First FM tuner with Automatic RF Attenuator.

1966 First FM tuner to achieve 0.6 db capture ratio—three times better than the best previous achievement.

1966 First FM Tuner to use a 10-megacycle-wide Counter Detector, eliminating distortion for the life of the set.

1966 First FM Tuner with Clear Signal Indicator.

1966 First FM Tuner to incorporate a Power Amplifier Circuit for high-quality, low-impedance headphones.

1966 First time-division multiplex circuit to incorporate a Four-Diode Coincidence Circuit.

1966 First Receiver with *Transist-O-Gard*® protection.

1967 First to introduce high fidelity equipment with seven integrated circuits (IC's).

1967 First loudspeaker system with 18″ free-suspension bass speaker.

1968 First receiver with AUTOSCAN®—totally silent *electronic* touch tuning—and TUNE-O-MATIC® pushbutton electronic tuning.

1968 First and only FM tuner with a dual gate MOSFET, achieving dynamic range, on signal strength, of 1,000,000 to 1.

1968 First AM tuner with dual-transistor RF and mixer stages to permit reception without overload of signals as high as 3 volts (3,000,000 uV).

1969 First receiver with sequential AUTOSCAN® signal seeking.

1969 First bookshelf speaker system with 15″ free-piston woofer in a compact enclosure.

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Your new FISHER 450-T is a fully transistorized receiver that houses all the electronics of a complete high-fidelity stereo system in one compact, decorator-styled unit. It is actually a no-compromise combination of three separate FISHER components: a sensitive, wideband AM-FM-stereo tuner; a versatile, low-noise preamp-control unit; and a wideband, low-distortion power amplifier. The FM-tuner section itself incorporates several design innovations, among them an FET front end with AUTOSCAN® touch tuning, an integrated-circuit IF amplifier, and a multiplex decoder with exclusive STEREO BEACON®*.

While quite simple to operate, the 450-T is also extremely versatile, permitting immediate radio-listening enjoyment with just the addition of your speakers and the FM dipole antenna, and—with the subsequent connection of suitable accessories—expansion into a complete home entertainment system. It will play a wealth of program sources: AM, FM, and FM-stereo broadcasts, mono and stereo phonograph records, and up to *two* auxiliary sources of your choice. (Special facilities are also included for adding reverberation with the FISHER K-10 DYNAMIC SPACEXPANDER®, and—on domestic sets—for connecting up to *two* tape recorders, permitting you to record any program of your choice and to make duplicate tapes if desired.) Whatever the program, the unit's complete array of controls and switches enable you to texture the sound to suit your personal tastes and listening conditions, and to listen through any desired combination of main speakers, optional remote speakers, and conveniently connected stereo headphones. In all cases, the 450-T's advanced design and superior performance assure you of sensitive, noise-free radio reception; excellent channel separation on all stereo sources; wideband audio response; and ample low-distortion power reserve—characteristics producing that effortless 'transparent' sound that has become the hallmark of FISHER transistorized components.

Reliability is another traditional FISHER hallmark. The superb performance of this instrument will last for years to come because of its inherently conservative design. All parts are rated for operating conditions that far exceed any likely to be encountered in normal use. As an extra precaution, the output transistors are electronically protected against possible short-circuit or overload damage by the unique *Transist-O-Gard*® circuit.

A final word—the 450-T, like any precision electronic instrument, will realize its full performance capabilities only when permitted to do so by the user. Even if you've had previous experience with other high-fidelity components, we urge you to follow the first two sections of this manual *carefully* while installing the receiver and operating it for the first time. Their contents are extremely important and can save you time while helping you to avoid needless disappointment.

*The trademark, STEREO BEACON®, signifies this model has the exclusive convenience feature that automatically switches to the stereo mode, signals the presence of the stereo broadcast, and automatically switches back to mono again—according to the type of program being received.

INSTALLING THE RECEIVER

While installation is relatively simple, certain precautions must be observed. PLEASE KEEP IN MIND THAT OUR WARRANTY DOES NOT COVER DAMAGE CAUSED BY MISHANDLING, MISUSE, EXCESSIVE LINE VOLTAGE, OR INSUFFICIENT VENTILATION. We therefore urge you to follow the instructions in this section (keyed to Figure 1) carefully and in sequence; you may then proceed directly to the next section, *OPERATING THE RECEIVER.*

WARNING: This receiver has an extremely high maximum music-power output. Make sure that each of your main speakers can safely handle *at least one-half* the music-power rating on this manual's *TECHNICAL SPECIFICATIONS* page. (The Operating Instructions for all FISHER speakers state their maximum power-handling capacities.) If your speakers *cannot* handle this much power, do *not* turn the receiver's VOLUME control up too high. FAILURE TO OBSERVE THIS PRECAUTION MAY PERMANENTLY DAMAGE YOUR SPEAKERS!

❶ POWER REQUIREMENTS

Make sure that the electrical power in your home is 50-60 Hz (cps) AC and that its voltage matches the voltage specified on the receiver's rear nameplate (or — in some cases — on a yellow tag on the power cord). **If local power is DC or if its voltage differs appreciably from that specified, your dealer or a qualified technician must make the necessary modifications to prevent damage to the set. *Do not connect the power cord to the electrical outlet or turn on the unit yet.***

❷ LOCATING THE RECEIVER

Place the receiver on any conveniently located shelf or table **that is away from radiators, warm-air ducts, or other sources of heat.** Never place the unit on a soft or yielding surface; this could impede ventilation through the underside of the chassis. Allow at least 2 inches clearance above and behind the unit for ventilation.

For enhanced appearance, the receiver may be installed in the FISHER 80-U component cabinet; this attractive decorator enclosure is available at your dealer. While the chassis may be inserted in the cabinet at any time, this procedure is simplest when performed *before* any connections have been made to the receiver. For information on installing the chassis in your own custom cabinet or console, refer to the *CUSTOM INSTALLATION* section of this manual. Do not attempt such installations without first reading that section.

❸ AM AND FM ANTENNAS

The set's AM antenna is the ferrite loopstick at the rear. **Keep all speaker, audio, and power cables away from this antenna and never use it as a handle.** Unfold the 'T'-shaped antenna supplied with the unit and connect its spade lugs to the receiver's FM ANT. terminals as shown in Figure 1. Make sure that the lugs do not touch each other, adjacent terminals, or the receiver chassis. Fasten the antenna's short arms horizontally to a *nonmetallic* surface such as a window, the rear surface of a cabinet or shelf, a wall, or (in some strong-signal areas) under a rug or carpet. Use masking tape until you determine the best antenna location on the basis of subsequent listening tests. Later, use metallic staples or tacks if you wish, but make sure that they don't cut or short-circuit the antenna wires. If the lead-in is too short to reach between the receiver and the desired antenna location, simply extend it with 300-ohm twin lead (the same material used for the antenna itself) which can be purchased at any electronic-parts dealer. Keep the extra lead-in as short as possible.

These antennas should yield excellent results in most cases. However, certain urban localities with severe FM-multipath interference, some steel buildings, or distant 'fringe' areas with weak-signal problems may require external antennas. If you encounter consistently poor FM or AM reception when operating the set, refer to the *ANTENNAS* section of this manual.

❹ MAIN SPEAKERS

CAUTION: Make sure that each speaker's rated impedance is 4 ohms or higher. (Look near its connecting terminals or in its instruction book for the value or, if necessary, consult your dealer.) When connecting the speakers, make sure that the bare wires at the ends of each cable do not touch each other, adjacent terminals, or the receiver chassis. Never connect the Left Speakers and Right Speakers MAIN terminals to each other. Failure to observe these precautions may cause severe overload and distortion.

(a) Place both speakers against a wall or on a shelf so that they face your selected listening position. Make sure that they are equidistant from you, no more than 10 to 15 feet apart (to prevent exaggerated stereo effects) and as close as possible to ear level (for maximum clarity). Later on, when operating the unit, you can determine optimum locations on the basis of listening tests.

(b) If the speakers are each 50 feet or less from the receiver, use the cables supplied with the speakers or ordinary No. 18 two-conductor lamp cord or antenna twin-lead for the connections. For longer distances, use heavy-duty cable (at least No. 16). Cut two cables to the desired length but leave some slack in case you want to change speaker locations slightly. Strip about half an inch of insulation from both ends of each conductor and twist the bare wires to gather up loose strands. Look for some sort of marking on each cable that distinguishes one conductor from another: a distinctive color, stripe, or raised ridge *on* one of the insulators, a thread *under* one of the insulators, or a different color metal for each wire. This will help you to 'phase' the speakers in step c.

(c) Connect the speaker at the left of your *listening* position to the receiver's LEFT SPEAKERS terminal strip (MAIN and adjacent COM terminal) and the speaker at your right to the RIGHT SPEAKERS terminal strip (MAIN and adjacent COM terminal). **For correct stereo perspective and good bass response, make sure that the speakers are connected *'in phase'* (each speaker's COM, GND, C, G, or black terminal connected to the receiver's corresponding COM terminal as shown in Figure 1).** Later on, when operating the receiver, check for correct phasing by playing an FM program with the MONO MODE pushbutton pressed *in*. If deep bass tones sound normal, the speakers are in phase. If they sound weak or 'tinny', the speakers are out of phase; in this case, temporarily

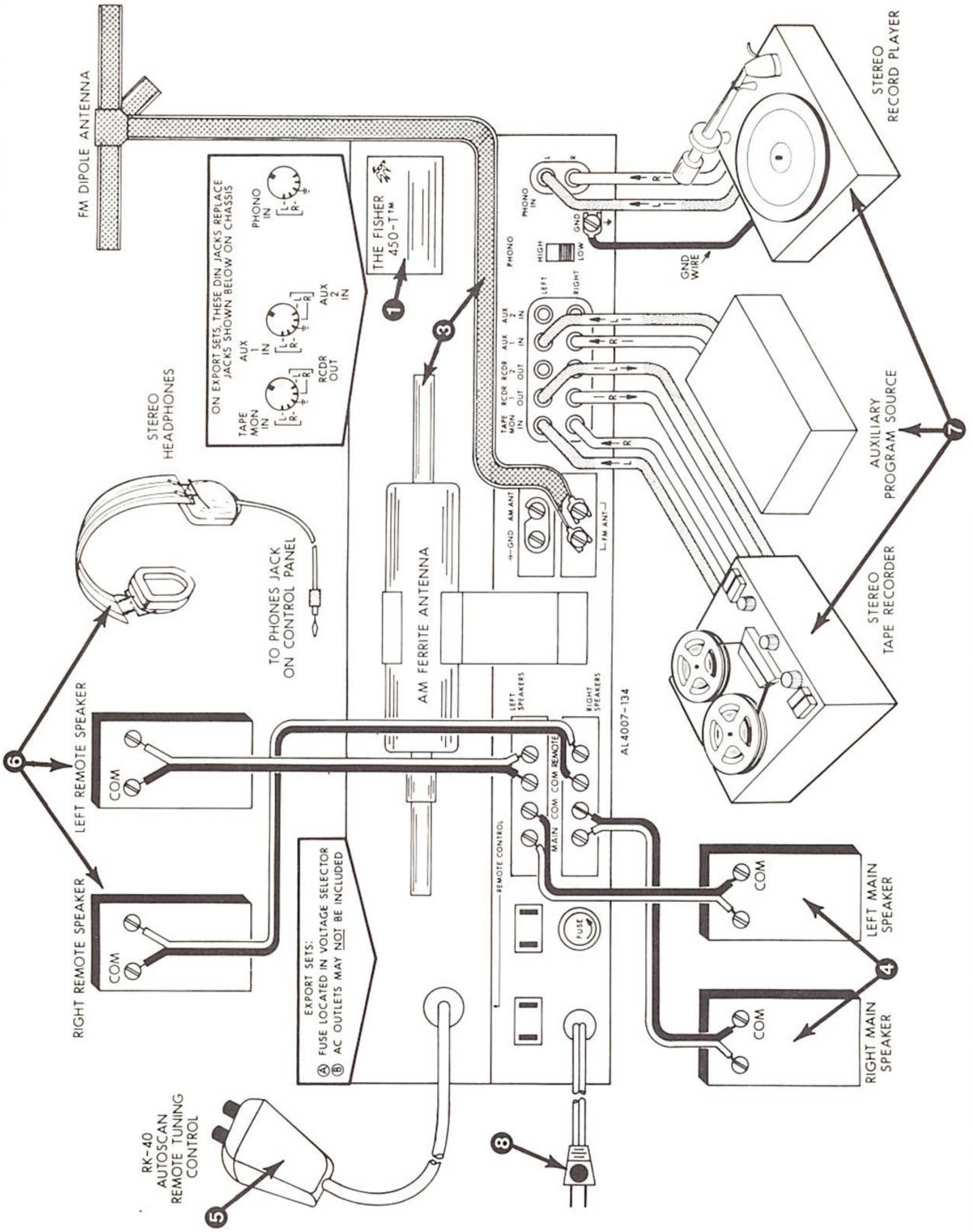

Figure 1. Receiver Connections

turn off the receiver and carefully reverse the connections at *one* of the speakers.

NOTE: If you are temporarily using only one speaker, connect it to the LEFT SPEAKERS terminal strip as described in step c. Then press in the receiver's MONO MODE pushbutton and turn the BALANCE control fully to the left. Keep these controls in these positions until you connect a second speaker.

❺ RK-40 REMOTE TUNING CONTROL

The RK-40 Remote Tuning Control supplied is expressly designed to extend the precision and simplicity of AUTOSCAN tuning to any convenient location up to 20 feet from the receiver. Simply unwind the RK-40's control cable to the desired length, line up the keyway groove on its plug with the keyway notch on the five-pin REMOTE CONTROL jack at the rear of the receiver, and push the plug straight into the jack. The RK-40 may be left permanently connected to the receiver without affecting normal operation in any way.

❻ HEADPHONES AND REMOTE SPEAKERS

To augment the main speakers, provisions have been included for connecting a set of stereo headphones (for private listening) and a pair of remote extension speakers (for stereo listening in another room). Please refer to the *HEADPHONES AND REMOTE SPEAKERS* section.

❼ ADDITIONAL COMPONENTS

The *ADDITIONAL COMPONENTS* section provides instructions for connecting a record player or changer to the receiver as well as up to *two* auxiliary program sources, one *or* two tape recorders, decks, or players, and the K-10 DYNAMIC SPACEXPANDER®. We recommend, however, that you complete this section first, go on to *OPERATING THE RECEIVER,* and familiarize yourself with basic operations before connecting any such units.

❽ FINAL CHECK

Recheck all connections made to the receiver. Plug the power cord into a convenient electrical outlet and proceed to *OPERATING THE RECEIVER.*

OPERATING THE RECEIVER

This section — keyed to Figure 2 — describes the receiver's controls in the order in which you would normally use them. Follow the instructions in step-by-step sequence and you'll find that, in a very short time, you will have mastered complete operation of the unit.

❶ AC POWER SWITCH AND VOLUME CONTROL

Turn this control to the right (towards 10) until it clicks. The tuning dial and meter will light to indicate that the receiver is on. After selecting the program source you want (item 2), adjust the VOLUME control for a comfortable listening level. To shut off the unit, turn the control to AC OFF until it clicks.

NOTE: If the unit does not go on under the conditions described above, or if it suddenly goes off during normal operation, refer to *REPLACING THE POWER FUSE* in the *MAINTENANCE* section of this manual.

❷ SELECTOR SWITCH

Select the program source you want to hear (except tapes played back on your *first* tape recorder, deck, or player; covered in item 3) by setting this switch to the appropriate position:

- **PHONO** — to play phonograph records through the receiver if you connect a record player having a magnetic cartridge (as described in the *ADDITIONAL COMPONENTS* section). This position automatically provides standard RIAA equalization (tonal correction) for proper playback of modern stereo and mono LP records.
- **AM** — to listen to radio programs on the AM standard-broadcast band (510-1630 kHz). Programs in this band are monophonic only and consist chiefly of news, sports, and popular music.
- **FM** — to listen to radio programs on the FM-broadcast band (88-108 MHz). Broadcasts in this band are high-fidelity (and, in many cases, stereophonic) and are relatively immune to natural and man-made electrical noise. They are therefore widely used for symphonic concerts, operas, and other musical and cultural programs. See item 6 for FM (and AM) tuning instructions.
- **AUX 1** — to play a stereo or mono auxiliary device (AM short-wave or multiband tuner, TV set, sound-movie projector, etc.) through the receiver. Refer to the *ADDITIONAL COMPONENTS* section before connecting any such devices.
- **AUX 2** — to play a *second* auxiliary program source (or — on *domestic* sets — the playback outputs of a second tape recorder or deck) through the receiver. Refer also to *ADDITIONAL COMPONENTS.*

NOTE: While listening to any of these program sources, you may simultaneously record it on the *first* tape recorder or deck connected to the unit. Refer to the *ADDITIONAL COMPONENTS* section for details.

❸ TAPE MON PUSHBUTTON

Normally, keep this pushbutton *out;* otherwise, any program source chosen with the SELECTOR switch will be silenced. Press it in only when *playing back or monitoring* tapes through the receiver from your *first* tape recorder, deck or player connected to the TAPE MON IN jacks. (Refer to the *ADDITIONAL COMPONENTS* section for details.)

❹ SPKRS PUSHBUTTONS

Normally, keep the MAIN SPKRS pushbutton pressed *in* to hear the selected program source through your main speakers. When listening through headphones, you may *silence* the main speakers by pressing the pushbutton so that it pops *out.* (Even without headphones, this is a convenient way to silence your music system momentarily without shutting off the receiver or changing its VOLUME setting.) If you connect stereo remote speakers to the receiver, you may turn *them* on and off with the REMOTE SPKRS pushbutton. By using the two pushbuttons in appropriate combinations, you may listen through main speakers only, remote speakers only, or both sets

simultaneously. For further information, refer to the *HEADPHONES AND REMOTE SPEAKERS* section.

❺ MONO MODE PUSHBUTTON

This pushbutton determines whether you will hear mono or stereo sound from your speakers and headphones. **When listening to FM broadcasts (either mono *or* stereo), always keep the button *out* (stereo position); in most cases, the set will *automatically* switch between mono and stereo reproduction for you to match the type of program received.** (The STEREO BEACON lamp at the left of the tuning dial will light whenever the set is in the FM-stereo mode.) For the rare exception to this rule, refer to *TUNING* (item 6).

When listening to a record, tape, or auxiliary program source, keep the button *out* if the particular program is stereophonic (so that you actually *hear* stereo sound) **and press it *in* if the program is monophonic** (to ensure that you always hear the program through both channels — though monophonically—and to minimize objectionable rumble and distortion from older mono records.) **AM broadcasts will always be heard through both channels, whether the button is in *or* out.**

NOTE: When temporarily using only one speaker (as described in *INSTALLING THE RECEIVER),* always keep this button *in* until you connect a second speaker.

❻ TUNING

Three alternate tuning methods are provided: continuous manual tuning for both FM *and* AM, AUTOSCAN® for ultra-precise *electronic* tuning along the FM band at the touch of a button on the set, and *remote* AUTOSCAN for touch tuning from the comfort of your listening position. Each method is described in detail below. Please follow these instructions carefully.

Ⓐ **MANUAL TUNING**—To tune in an FM or AM station *manually,* set the SELECTOR switch to FM or AM and proceed as follows. *On AM, use step 3 only.*

(1) On the ELECTRONIC TUNING portion of the control panel, *release* the AUTOSCAN MODE pushbutton. This activates the manual TUNING knob and the main FM tuning dial. On AM, this step is unnecessary.

(2) Press *in* the AFC OFF pushbutton. **Don't forget to do this; it's important for accurate FM tuning.** On AM, this step is unnecessary.

(3) Turn the manual TUNING knob *slowly* until the main dial pointer indicates either the desired station on the appropriate band scale (FM or AM) or a coinciding number on the small 0-10 logging scale along the middle of the dial. **Use whichever scale is more convenient, but always tune each station for the highest possible reading on the 0-5 scale of the tuning meter (at the left of the dial) and for clear, undistorted sound with minimum interference from adjacent stations.**

(4) On FM only, *release* the AFC OFF pushbutton. **Always remember to press *in* the AFC OFF button when tuning on the FM band and to *release* it again when listening to the station of your choice.**

NOTE: If the STEREO BEACON lamp starts to blink on and off during an FM-stereo broadcast, or if the program sounds noisy, distorted, or erratic in quality, the station signal might be weak or marred by transmission or reception problems. In this case, press in the MONO MODE pushbutton; the blinking and interference should stop and you can listen to the program monophonically. If this doesn't help, the interference may be caused by a strong nearby station; try pressing in the FM LOCAL pushbutton (item 7). Should you encounter this problem with many stations, you may be in a locality that requires a different antenna for reliable reception. Please refer to *FM ANTENNAS* in the *ANTENNAS* section of this manual. Similarly, if you encounter consistently poor AM reception, refer to *AM ANTENNAS.*

Ⓑ **AUTOSCAN**—is a completely *electronic* FM-tuning mode (using no motors or moving parts of any sort) in which the set will automatically scan up the FM band at the touch of a pushbutton. It will do so either one station at a time *or* continuously, as required, and will lock on the desired station with a degree of accuracy unmatched by any conventional tuning method. Proceed as follows:

(1) Set the SELECTOR switch to FM. On the ELECTRONIC TUNING portion of the control panel, press *in* the AUTOSCAN MODE pushbutton. This activates the adjacent CONTINUOUS ADVANCE and ONE-STATION

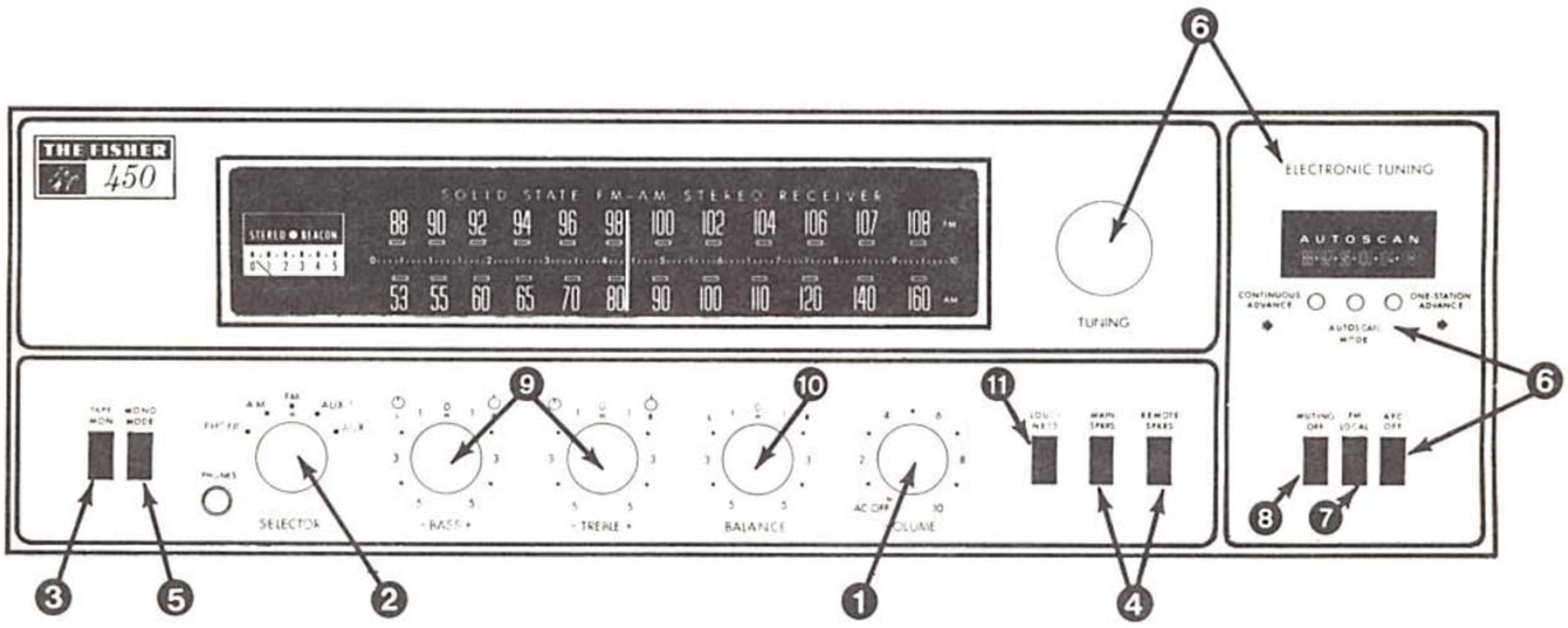

Figure 2. Control Panel of the Receiver

simultaneously. For further information, refer to the *HEADPHONES AND REMOTE SPEAKERS* section.

❺ MONO MODE PUSHBUTTON

This pushbutton determines whether you will hear mono or stereo sound from your speakers and headphones. **When listening to FM broadcasts (either mono *or* stereo), always keep the button *out* (stereo position); in most cases, the set will *automatically* switch between mono and stereo reproduction for you to match the type of program received.** (The STEREO BEACON lamp at the left of the tuning dial will light whenever the set is in the FM-stereo mode.) For the rare exception to this rule, refer to *TUNING* (item 6).

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(1) On the ELECTRONIC TUNING portion of the control panel, *release* the AUTOSCAN MODE pushbutton. This activates the manual TUNING knob and the main FM tuning dial. On AM, this step is unnecessary.

(2) Press *in* the AFC OFF pushbutton. **Don't forget to do this; it's important for accurate FM tuning.** On AM, this step is unnecessary.

(3) Turn the manual TUNING knob *slowly* until the main dial pointer indicates either the desired station on the appropriate band scale (FM or AM) or a coinciding number on the small 0-10 logging scale along the middle of the dial. **Use whichever scale is more convenient, but always tune each station for the highest possible reading on the 0-5 scale of the tuning meter (at the left of the dial) and for clear, undistorted sound with minimum interference from adjacent stations.**

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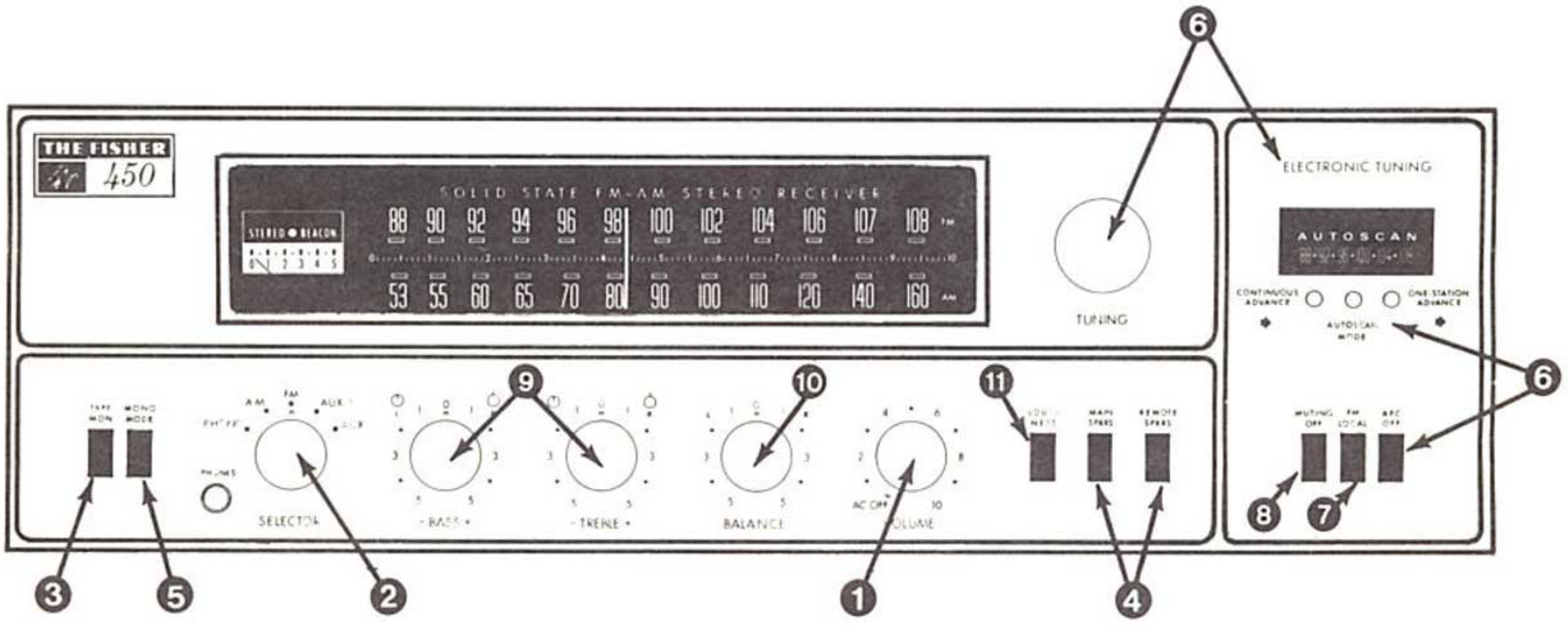


Figure 2. Control Panel of the Receiver

ADVANCE pushbuttons, and lights the AUTOSCAN meter directly above.

NOTE: Both ADVANCE pushbuttons tune the set *up* the FM band (towards 108 MHz), with the CONTINUOUS ADVANCE pushbutton acting as a coarse tuning control and the ONE-STATION ADVANCE pushbutton as a fine-tuning control. We suggest that you use them as follows:

(2) If the AUTOSCAN meter indicates that the set is tuned to a station *slightly below* the one you want—alternately press in and release the ONE-STATION ADVANCE pushbutton until you hear the station of your choice. Each time you press in the pushbutton, the set will tune up the FM band to the next available station (of sufficient signal strength) and will automatically lock on the *exact center-of-channel* for that station. At the same time, the AUTOSCAN meter reading will change to indicate that station's approximate broadcast frequency. Note that the set is completely silenced while tuning from station to station.

(3) If the AUTOSCAN meter indicates that the set is tuned to a station *far below* the one you want—press and *hold in* the CONTINUOUS ADVANCE pushbutton until the meter indicates that you're approaching (but haven't yet reached) the desired station. Then release the pushbutton, listen to the station tuned in, and—if necessary—fine-tune towards the desired station with the ONE-STATION ADVANCE pushbutton as described in step 2.

(4) If the AUTOSCAN meter indicates that the set is tuned to a station *above* the one you want—simply press and *hold in* the CONTINUOUS ADVANCE pushbutton until the set tunes all the way to the high end of the band (108 on the meter), recycles to the low end of the band (88 on the meter), and approaches the desired station from below. Then release the pushbutton, listen to the station tuned in, and—if necessary—fine-tune towards the desired station with the ONE-STATION ADVANCE pushbutton as described in step 2.

NOTE: Whenever you switch *out* of the AUTOSCAN mode, the set will not retain the last station you tuned in. Since AUTOSCAN is not a 'memory' tuning mode, this is perfectly normal and does not indicate a malfunction.

C **REMOTE AUTOSCAN**—After switching the receiver to FM reception and placing it in the AUTOSCAN tuning mode as previously described, use the ADVANCE pushbuttons on the RK-40 Remote Control as you would those on the receiver, *but with one exception:* When tuning towards a station that is quite far up the band from your starting point, alternately press in and release the RK-40's CONTINUOUS ADVANCE pushbutton so that you skip only two or three stations at a time. Do *not* try to approach the station in one continuous sweep with the RK-40. This technique—which depends on the receiver's AUTOSCAN meter as a visual guide to your progress up the FM band—would be extremely difficult from your remote-control position.

⑦ FM LOCAL PUSHBUTTON

Normally, keep this pushbutton *out*. Press it in only when listening to a *very* strong, nearby FM-stereo station that sounds objectionably noisy and distorted and appears at more than one point on the dial (and pressing in the MONO MODE pushbutton doesn't reduce interference). You shouldn't have to press in this button very often, but when you do, please remember to release it again when listening to normal-strength stations.

⑧ MUTING OFF PUSHBUTTON

Normally, keep this pushbutton *out* to silence between-station noise and extremely weak stations on the FM band. (These stations are difficult to tune in, almost impossible to listen to in stereo, and do not provide the noise-free reception possible only with stronger signals.) However, should you want to search for and listen to such stations when tuning *manually*, press *in* the pushbutton.

NOTE: If any of these weak stations is adjacent on the dial to a strong local station, you may be able to improve reception of the weaker station by temporarily pressing *in* the AFC OFF pushbutton while listening. This will prevent the AFC circuits from 'pulling' towards the stronger station.

⑨ BASS AND TREBLE CONTROLS

In most cases — especially with modern recordings and FM broadcasts—keep both controls set at their normal mid-positions (marked 0) for natural tonal quality of speech and music. But if a particular record, broadcast, tape, or other program source has poor tone, or if the acoustical properties of your listening room, speakers, or headphones affect the sound unnaturally, adjust the controls as follows:

To correct for thinness in the bass-baritone voice, lower-pitched solo or orchestral instruments, low pedal notes of the organ, etc., turn the BASS control the desired amount towards +. If bass tones sound 'boomy' (or if the program material is marred by rumble, hum, or other low-pitched noise), turn the control towards —.

If speech sibilants, the soprano voice, and higher-pitched instruments (violin, piccolo, cymbals, etc.) sound 'muddy' or unclear, turn the TREBLE control the desired amount towards +. If these sound too harsh or 'wiry' (or if the program is marred by objectionable hiss, scratch, or clicks), turn the control towards —.

Each of these controls has two parts: the outer segment of the knob for the left channel and the inner segment for the right channel. Normally, both parts of each knob turn together as one unit, but you may adjust the tonal quality of each channel *separately* by holding one part of the knob and turning the other. You may use this feature either to compensate for tonal imbalances (when using a different type of speaker in each channel) or to create a synthetic 'stereo' effect when playing a mono program. For the latter, simply turn the left-channel BASS and right-channel TREBLE all the way to —. The receiver will then act like an electronic crossover, feeding only the higher-pitched tones to the left channel and the lower-pitched tones to the right channel. While this is *not* true stereo, it does produce a directional effect and imparts added clarity to older program material. Please remember to return the controls to their normal settings for conventional mono and stereo reproduction.

⑩ BALANCE CONTROL

Adjust the BALANCE control so that the volume levels from both channels sound about equal from your *listening* position. Ideally, this should occur with the control set at its normal mid-position (marked 0). However, imbalances in the program source, unusual room layout, or your position with respect to the speakers may make it necessary to turn the control either towards R (to emphasize the sound on your right) or towards L (to emphasize the sound on your left). At the extreme settings of this control, only one channel or the other will be heard. *Do not use the BALANCE control as a substitute for the VOLUME control.*

NOTE: When temporarily using only one speaker (as described in *INSTALLING THE RECEIVER),* always keep the control turned fully left until you connect a second speaker.

⑪ LOUDNESS PUSHBUTTON

Use this button only at *low* VOLUME control settings to compensate for the apparent 'thinning out' of music and speech. (This effect is caused by the ear's naturally reduced sensitivity to low- and high-pitched tones at low listening levels.) With the button *in,* these tones are automatically emphasized by a predetermined amount to restore body and brilliance to the program material. At normal and high VOLUME settings, keep the button *out* to prevent boominess or overload on some speakers.

ANTENNAS

FM ANTENNAS

The following paragraphs provide instructions for replacing the dipole antenna with other indoor or outdoor antennas to suit local reception conditions:

REDUCING MULTIPATH INTERFERENCE — In some strong-signal localities, pronounced signal reflections from surrounding buildings, towers, or hills may cause severe multipath interference. (This phenomenon is similar to 'ghosts' in TV pictures and can cause distortion, 'fuzziness', and reduced left-right separation in FM-stereo broadcasts.) In such cases, it may be necessary to replace the dipole antenna with an indoor 'rabbit-ears' or telescoping-dipole antenna that can be rotated for best reception of the desired signal and maximum rejection of the unwanted reflections. (This type of antenna is available at most electronic-parts dealers.) Disconnect the dipole antenna from the FM ANT. terminals (Figure 1) and connect the rabbit-ears antenna in its place, making sure that the antenna lugs or wires do not touch each other, adjacent terminals, or the receiver chassis. Tune in several FM stations and rotate the antenna for best reception in each case.

IMPROVING FRINGE-AREA RECEPTION AND REDUCING ELECTRICAL INTERFERENCE — In weak-signal 'fringe' areas, an outdoor antenna may be necessary, especially for effective, noise-free FM-stereo reception. If you already have an outdoor VHF *television* antenna, and most FM signals in your area come from the same general direction as the TV signals, the antenna may prove suitable for FM reception as well. To test it, disconnect the dipole antenna from the FM ANT. terminals (Figure 1) and connect the TV antenna in place, making sure that the antenna lugs or wires do not touch each other, adjacent terminals, or the receiver chassis. If the results are satisfactory, obtain a two-set antenna coupler so that you can operate both the TV set and the receiver from the antenna simultaneously.

If reception is unsatisfactory, you'll have to connect an outdoor antenna designed specifically for FM. In medium-fringe areas (up to 30 or 40 miles from stations), where most signals come from the same general direction, a folded dipole with reflector should provide good results. If signals come from several *different* directions, an omnidirectional antenna such as a cross-dipole, 'turnstile', or 'S' will eliminate the necessity for an antenna rotator. For deep fringe areas 50 miles or more from stations, a high-gain 'Yagi' array or Log-Periodic antenna is recommended. These antennas are quite directional however, and if station signals come from several directions, you'll probably require a remote-control antenna rotator.

If you live near a busy thoroughfare or industrial area, and the outdoor antenna is connected to the set with conventional 300-ohm twin-lead, interference from automotive ignition systems or electrical machinery may radiate into the long lead-in, causing objectionable noises throughout the FM band. In such cases, replace the conventional lead-in with *shielded* 300-ohm twin-lead (available at major electronic-parts dealers). Connect the lead-in's two signal conductors to the receiver's FM ANT. terminals in the usual manner; connect the shield to the GND terminal next to the AM ANT. terminal.

AM ANTENNAS

If AM reception is marred because you live in a steel-frame building, or if you want to supplement the built-in AM antenna for improved reception of weaker stations, loosen the AM ANT. and GND screws (Figure 1) and swing the link between them out of the way. Retighten the GND screw and connect 10 to 20 feet of insulated, flexible, single-conductor wire to the AM ANT. terminal. Keep this wire away from all speaker, audio, and power cables. Run the wire in a straight line along a *non-metallic* baseboard or under a rug. In some cases, reception may be further improved by draping the wire out a window or by connecting it to an outdoor whip or rod antenna.

HEADPHONES AND REMOTE SPEAKERS

WARNING: This receiver has an extremely high music-power output. Make sure that each of your remote speakers can safely handle *at least one-half* the music-power rating on this manual's *TECHNICAL SPECIFICATIONS* page. (The Operating Instructions for all FISHER speakers state their maximum power-handling capacities.) If your speakers *cannot* handle this much power, do *not* turn the receiver's VOLUME control up too high unless you play your remote *and* main speakers simultaneously. FAILURE TO OBSERVE THIS PRECAUTION MAY PERMANENTLY DAMAGE YOUR SPEAKERS!

HEADPHONES

For private listening to all program sources, you may plug a pair of FISHER headphones (or other similar high-quality low- or medium-impedance devices) into the PHONES jack on the control panel. Almost all commercial stereo headphones are equipped with the proper type of plug to fit this jack. In the rare event that yours are not, obtain a standard ¼-inch three-pole phone plug and connect it to the phones as shown in Figure 3.

When using the headphones for the first time, turn the VOLUME control to minimum and release the MAIN SPKRS pushbutton *before* plugging in the phones. Readjust the VOLUME control for a comfortable *headphone* listening level and use this setting for future reference.

CAUTION: Do not leave the headphones plugged in when playing the speakers at high volume levels. The large amounts of audio power required by the speakers at these levels can overload and damage the phones.

STEREO REMOTE SPEAKERS

The REMOTE and adjacent COM terminals on the LEFT SPEAKERS and RIGHT SPEAKERS terminal strips (Figure 1) provide convenient means for connecting a pair of remote extension speakers. This arrangement will enable you to enjoy stereo sound in another room of your home when you press in the REMOTE SPKRS pushbutton.

CAUTION: Never connect the Left Speakers and Right Speakers REMOTE terminals to each other. Also, *before* connecting your remote speakers, check their rated impedances and the impedances of your main speakers as well. If each speaker is rated at 8 or 16 ohms, you may safely connect the remote speakers as described in the following instructions. In the rare event that the main or remote speaker (or both) in each channel is rated at *4 ohms*, have a qualified technician add a protective resistor in series with the 4-ohm speaker in that channel (or both speakers in the channel, if both are rated at 4 ohms). The resistance value must be such that the net *parallel* impedance per channel remains 4 ohms or more. Failure to observe this precaution may cause severe overload and distortion when the main and remote speakers are played simultaneously (MAIN SPKRS *and* REMOTE SPKRS pushbuttons in).

(1) Turn off the receiver and disconnect its power cord from the electrical outlet.

(2) Place both speakers against a wall or on a shelf in the remote listening area so that they face your selected listening position. Make sure that they are equidistant from you, no more than 10 to 15 feet apart (to prevent exaggerated stereo effects) and as close as possible to ear level (for maximum clarity). Later on, you can determine optimum locations on the basis of listening tests.

(3) If the speakers are each 50 feet or less from the receiver, use the cables supplied with the speakers or ordinary No. 18 two-conductor lamp cord or antenna twin-lead for the connections. For longer distances, use heavy-duty cable (at least No. 16). Cut two cables to the desired length but leave some slack in case you want to change speaker locations slightly. Strip about half an inch of insulation from both ends of each conductor and twist the bare wires to gather up loose strands. Look for some sort of marking on each cable that distinguishes one conductor from another: a distinctive color, stripe, or raised ridge *on* one of the insulators, a thread *under* one of the insulators, or a different color metal for each wire. This will help you to 'phase' the speakers in step 4.

(4) Connect the speaker at the left of your *listening* position to the receiver's LEFT SPEAKERS terminal strip (REMOTE and adjacent COM terminal) and the speaker at your right to the RIGHT SPEAKERS terminal strip (REMOTE and adjacent COM terminal). **For correct stereo perspective and good bass response, make sure that the speakers are connected *'in phase'* (each speaker's COM, GND, C, G, or black terminal connected to the receiver's corresponding COM terminal as shown in Figure 1).** Check that the bare wires at the ends of all cables do not touch each other, adjacent terminals, or the chassis.

(5) Connect the power cord to the electrical outlet and turn on the receiver. Press in the REMOTE SPKRS and MONO MODE pushbuttons and play a record or FM program through the receiver. If the deep bass tones sound normal, the speakers are in phase. If they sound weak or 'tinny', the speakers are out of phase; in this case, turn off the receiver and carefully reverse the connections at *one* of the speakers. Turn on the receiver and listen for normal bass.

(6) Press the MONO MODE pushbutton so that it pops out (stereo position) and play a *stereo* record or FM program. Experiment with speaker placement until you find the permanent location that best suits your personal tastes and listening conditions.

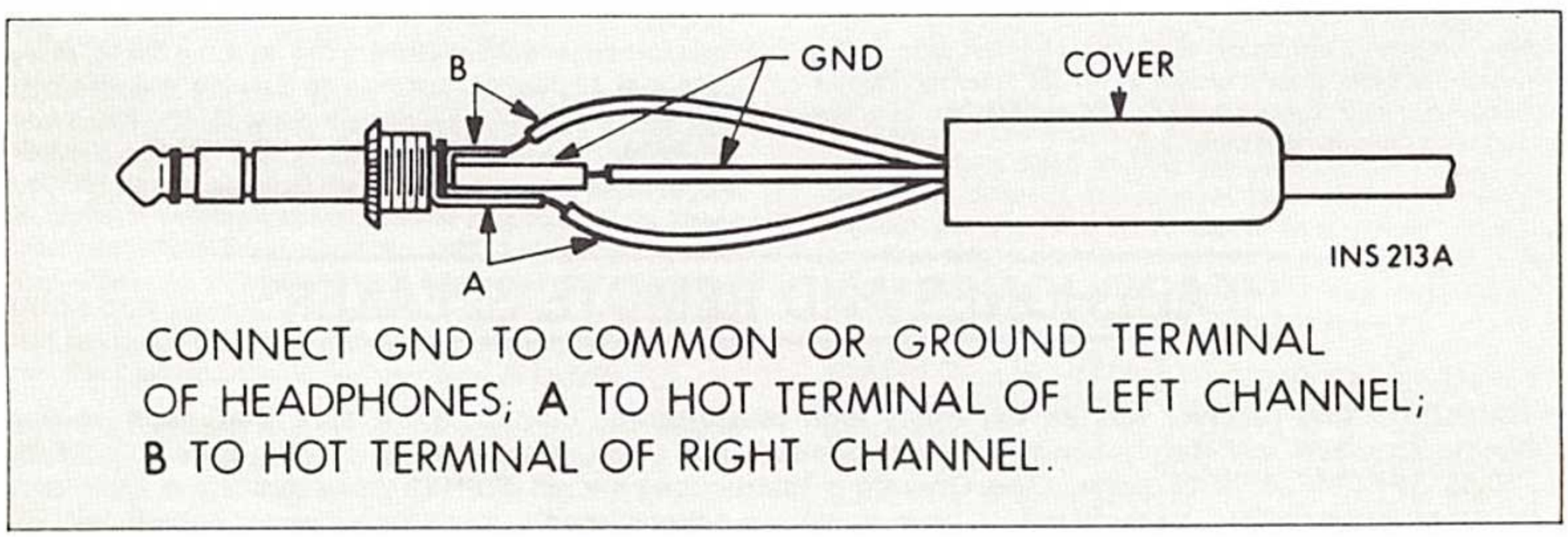


Figure 3. Headphone Plug Connections

ADDITIONAL COMPONENTS

RECORD PLAYER OR CHANGER

To connect a record player or changer having a magnetic cartridge, use Figure 1 and the following instructions. **Make sure that the PHONO switch at the rear of the receiver is set to LOW.**

(1) If the record player or changer has a ground wire (often green in color, with a spade lug at the free end), connect the lug to the GND terminal near the receiver's PHONO IN jacks. *This is important for hum-free sound.*

(2) Connect the record player's shielded cables to the receiver's PHONO IN jacks. Usually, the record player's Instruction Manual will tell how to distinguish the left- and right-channel cables. If you cannot determine which cable is for which channel, temporarily connect them at random; you can check for correct left-right stereo placement in step 4.

(3) Connect the record player's power cord to a convenient electrical outlet or to a switched outlet at the rear of the receiver (if included on your unit). In either case, keep the power cord as far as possible from all shielded cables.

(4) Set the receiver's SELECTOR switch to PHONO and keep the MONO MODE pushbutton *out*. Play a *stereo* symphonic or orchestral recording and adjust the VOLUME control for a comfortable listening level. Listen to the placement of the violins; if they seem to come from—or near—the left speaker (please remember, left as viewed from your *listening* position), the phono cables are properly connected. If they seem to come from the right, switch the right- and left-channel cables at the receiver.

NOTE: In the rare event that you hear only weak and distorted sound from the record, the phono leads at the rear of the pickup cartridge have been inadvertently connected to the wrong terminals, causing the left- and right-channel signals to be out of phase with each other. To correct this, remove the cartridge shell from the tone arm, if possible, and use a pair of tweezers or long-nose pliers to switch the connections at the cartridge terminals for *one* stereo channel only. (Almost all stereo cartridges identify the left-channel terminals with an "L" and the right-channel terminals with an "R".) Plug the cartridge shell back into the tone arm.

(5) Set the SELECTOR switch to FM and tune in an FM broadcast having music similar to that on the record. Turn the SELECTOR back and forth between FM and PHONO and compare the relative volume levels of the two sources: they should be approximately equal *without you having to readjust the VOLUME control drastically each time you switch.* If PHONO volume is much higher than that of FM or sounds distorted on loud passages, set the PHONO switch (at the rear of the set) to HIGH. Turn the SELECTOR back and forth between FM and PHONO; the volume levels should now be almost equal.

(6) During normal operation with the record player, remember to keep the MONO MODE pushbutton *out* when playing stereo records and press it *in* when playing mono records. All other controls may be adjusted in the usual manner to suit your personal tastes.

AUXILIARY PROGRAM SOURCES

You may increase the versatility of the receiver by playing up to two additional mono or stereo program sources through its AUX 1 IN and AUX 2 IN jacks (Figure 1). Moreover, if the extra sources normally play through their own low-fidelity speakers and amplifiers, playing them through the receiver instead will improve their sound quality noticeably.

The auxiliary sources may be AM short-wave or multiband radio tuners, the audio outputs of TV sets or sound-movie projectors, electronic organs, or any other similar devices *so long as each has at least one medium- or low-impedance output jack providing about 250 mV to 3.0 volts of signal.* This type of jack is often marked CATHODE FOLLOWER, LINE OUTPUT, EXTERNAL AMPLIFIER (*not* EXTERNAL SPEAKER), TAPE RECORDER, or the like. If a device does not have the required jack, a qualified service technician can install one and, if necessary, add provisions for switching off its built-in speakers. **If a device is an AC/DC or 'transformerless' type, make sure that the technician eliminates shock hazard and hum caused by a 'hot' (electrically unisolated) chassis. If you are in doubt about the safety characteristics of a device, do *not* connect it to the receiver.**

(1) If the first auxiliary device is monophonic (single channel) connect its single output jack to the receiver's left AUX 1 IN jack; use a shielded cable with the appropriate plug at each end. If the auxiliary device is stereophonic, it will have *two* such output jacks, one with the additional marking LEFT, L, A, or 1 and the other with the marking RIGHT, R, B, or 2. Using two shielded cables, connect the left output to the receiver's *left* AUX 1 IN jack and the right output to the receiver's *right* AUX 1 IN jack.

(2) Connect the auxiliary device's power cord to a convenient electrical outlet. Keep the power cord as far as possible from all shielded cables.

(3) Turn on the auxiliary device. Set the receiver's SELECTOR switch to AUX 1. If the auxiliary device is monophonic, press in the receiver's MONO MODE pushbutton; if the device is stereophonic, keep the button out. Adjust the receiver's VOLUME control for a comfortable level.

(4) Turn the receiver's SELECTOR switch back and forth between AUX 1 and FM and compare the relative volume levels of the two program sources: they should be approximately equal *without you having to readjust the VOLUME control drastically each time you switch.* If the auxiliary device has any controls that affect its volume (as heard through the *receiver),* adjust them, if necessary, to equalize the volume levels.

NOTE: To play the *second* auxiliary source through the receiver, connect and operate it as previously described, but use the AUX 2 IN jacks and the AUX 2 position of the SELECTOR switch.

TAPE RECORDERS, DECKS OR PLAYERS

The domestic version of this receiver has provisions for connecting up to *two* external tape recorders or tape decks. This dual-recorder facility provides you not only with a means of recording (and thus preserving) varied

program material played through the receiver, but also with a means of producing *duplicate* tape copies for yourself or your friends.

NOTE: The export version of this unit has facilities for only *one* recorder. In this case, simply disregard all subsequent instructions referring to the second recorder.

Connecting the *first* recorder as described in the following instructions will permit you to record any phonograph record, radio broadcast, or auxiliary program source chosen with the SELECTOR switch. You may later play *back* the recording (or any prerecorded tape) through the receiver simply by pressing in the TAPE MON pushbutton. (With some specially equipped recorders or decks, the TAPE MON button will also permit you to 'monitor' the quality of the taped signal *while recording.)* If you wish playback *only* (of commercially prerecorded tapes), you may connect a tape player (having self-contained preamplifiers) instead of the recorder or deck. In any event, the tape unit may be a reel-to-reel, cartridge, or cassette type.

Connecting the *second* recorder provides the additional, *two-way* capability of producing duplicate tape copies:

(1) While listening to a phonograph record, radio broadcast, or auxiliary program source (SELECTOR switch to PHONO, AM, FM, AUX 1, or AUX 2), you can record it on the first *and* second recorders *simultaneously.*

(2) If the receiver's AUX 2 IN jacks are presently not being used, you can connect the second recorder's playback outputs to these jacks. This will permit you to play back a tape on the *second* recorder (SELECTOR switch to AUX 2) and make a duplicate copy on the *first* recorder.

CONNECTING THE FIRST TAPE UNIT — Use the following instructions and Figure 1 to connect the *first* tape unit to the receiver. *When connecting a player, disregard step 1.*

(1) If the recorder or deck is monophonic (single channel), it may have a single high-level recording input marked HIGH LEVEL, LINE INPUT, PHONO, P.U., GRAM, or the like. Using a shielded cable with the appropriate plug at each end, connect this input to the receiver's left RCDR 1 OUT jack. If the recorder or deck is equipped to make stereo recordings, it will have *two* such high-level inputs, one with the additional marking LEFT, L, A, or 1 and the other with the marking RIGHT, R, B, or 2. Using two shielded cables, connect the left input to the receiver's *left* RCDR 1 OUT jack and the right input to the receiver's *right* RCDR 1 OUT jack.

CAUTION: If the only jacks included on your tape unit are extremely sensitive inputs marked MIC. or MICROPHONE, or (if it's a *European* recorder) RADIO or DIODE, do not connect them to the receiver without first plugging a *volume-control adapter* into each jack. These adapters (Switchcraft Part No. 368, Lafayette Part No. 99-C-0099, or equivalent) will attenuate the receiver's RCDR OUT signals to a usable level. Failure to do this will overload the recorder's input circuits, causing the resultant recordings to be severely distorted.

(2) If the recorder, deck, or player is monophonic (single channel), it may have a single playback output marked CATHODE FOLLOWER, LINE OUTPUT, MONITOR, EXTERNAL AMPLIFIER (*not* EXTERNAL SPEAKER), or the like. Using a shielded cable with the appropriate plug at each end, connect this output to the receiver's left TAPE MON IN jack. If the tape unit is equipped for stereo playback, it will have *two* such playback outputs, one with the additional marking LEFT, L, A, or 1 and the other with the marking RIGHT, R, B, or 2. Using two shielded cables, connect the left output to the *left* TAPE MON IN jack and the right output to the *right* TAPE MON IN jack.

(3) Connect the tape unit's power cord to a convenient electrical outlet. Keep the power cord as far as possible from all shielded cables that connect to the receiver.

CONNECTING THE SECOND TAPE UNIT — Follow the instructions for connecting the first unit, but with these differences: Connect the second tape unit's recording inputs to the receiver's *RCDR 2 OUT* jacks and its playback outputs to the receiver's *AUX 2 IN* jacks.

NOTE: If you had to disconnect a second auxiliary device from the receiver's AUX 2 IN jacks to accommodate the second tape unit—and you wish to play *both* program sources through the receiver without constantly having to disconnect one to reconnect the other—you may insert a 2- or 3-position stereo selector switchbox between the external sources and the receiver's AUX 2 IN jacks. This type of device (Switchcraft Part No. 668 or equivalent) is available at many high-fidelity or electronic-parts dealers.

RECORDING AND MONITORING — Use the following instructions as a general guide to recording (and — if your *first* recorder is properly equipped as described in step 2—to monitoring the tape while recording). Each tape unit's Instruction Manual will provide specific recording instructions.

(1) Choose the desired program source with the receiver's SELECTOR switch; *the source to which you are listening is the source that will be recorded.* Follow the appropriate tape unit's Instruction Manual for specific recording instructions. The SELECTOR switch is the only receiver control that has any effect on the recording (except, of course, the TUNING or ADVANCE controls, if you're recording a radio program); you may therefore adjust all other controls in the usual manner to suit your personal tastes and listening conditions.

(2) If you are absolutely certain that your *first* tape unit has *true* tape-monitor facilities (different circuits and heads for recording than for playback), you may monitor the tape—while recording—to compare its sound quality with that of the original program material from which it is being derived. This feature permits you to detect and correct any possible recording errors almost immediately. To monitor, alternate the receiver's TAPE MON pushbutton between *out* (to hear the original program material as usual) and *in* (to hear the same material, a fraction of a second later, *as it sounds on tape).* You may repeat this as often as you like, or even *keep* the pushbuttton in, without affecting or interrupting the recording process any way. **When you've *finished* recording on the first tape unit, remember to press the TAPE MON pushbutton so that it pops *out;* otherwise any program chosen with the SELECTOR will be silenced.**

PLAYBACK — To play back tapes from your *first* recorder, deck, or player, simply press in the receiver's TAPE MON pushbutton. To play back from the *second* tape unit, set the SELECTOR switch to AUX 2. In either case, if the tape is stereophonic, keep the receiver's MONO MODE pushbutton *out;* if either the tape or tape unit is monophonic, press *in* the pushbutton. Adjust all other receiver controls in the usual manner to suit your per-

sonal tastes. **When you've *finished* playing tapes on the first tape unit, remember to press the TAPE MON pushbutton so that it pops *out;* otherwise, any other program source chosen with the SELECTOR switch will be silenced.**

NOTE: If the tape unit being played is stereophonic and you wish to listen to a monophonic tape that has more than one track recorded on it, the tape unit must have track-selection facilities (to prevent playback of more than one track at a time); otherwise, an external track-selector switch must be used. To obtain a diagram of such a switch, write to: Mr. Richard Hamilton, Customer Relations Department, Fisher Radio, 11-40 45 Road, Long Island City, New York 11101.

DYNAMIC SPACEXPANDER®

The FISHER K-10 DYNAMIC SPACEXPANDER® is a unique reverberation device that can be used in conjunction with this receiver to recreate the acoustical environment of a large concert hall or theater in your listening room. Further details about this device may be obtained at your dealer. To connect a SPACEXPANDER to the receiver, proceed as follows:

(1) Install the SPACEXPANDER in a suitable location as described in its Instruction Manual.

(2) Connect *one* of the SPACEXPANDER's channel A INPUTS to the receiver's *left* RCDR 1 OUT jack.

(3) Connect *one* of the SPACEXPANDER's channel B INPUTS to the receiver's *right* RCDR 1 OUT jack.

NOTE: If you had to disconnect a tape recorder or deck from the receiver in steps 2 and 3 to accommodate the SPACEXPANDER, reconnect the recorder's high-level inputs to the SPACEXPANDER's *extra* channel A and B INPUTS. This will permit you to record from the receiver while still using the SPACEXPANDER. (The recordings, however, will not have reverberation since this effect is added *after* the point at which the recorder is connected.) Refer to the SPACEXPANDER manual for details.

(4) Connect the SPACEXPANDER's channel A OUTPUT to the receiver's *left* TAPE MON IN jack.

(5) Connect the SPACEXPANDER's channel B or C OUTPUT to the receiver's *right* TAPE MON IN jack.

NOTE: If you had to disconnect a tape recorder, deck, or player from the receiver in steps 4 and 5 to accommodate the SPACEXPANDER — and you still wish to play tapes through the receiver — reconnect the tape unit's playback outputs to the receiver's AUX 1 IN *or* AUX 2 IN jacks (whichever set is presently not in use) and use the AUX 1 or AUX 2 position of the SELECTOR switch; this will permit tape playback but not monitoring.

(6) Press in the receiver's TAPE MON pushbutton and *keep* it in whenever you use the SPACEXPANDER. **When the SPACEXPANDER is turned off or disconnected, *release* the pushbutton; otherwise, all program sources played through the receiver will be silenced.** Adjust all other receiver controls in the usual manner and operate the SPACEXPANDER as described in its Instruction Manual.

CUSTOM INSTALLATION

This section provides detailed instructions for installing your Fisher unit in a custom cabinet or console of your choice. Although the chassis may be installed either horizontally or vertically, keep in mind that horizontal installation is by far the simpler procedure and does not require a fan for safe operation. In either case, it is absolutely essential that you follow the installation instructions exactly and that you observe the following precautions:

Do not place the custom cabinet near a radiator, warm-air duct, or other source of heat. Keep the rear of the cabinet directly behind the chassis open and at least 2 inches away from a wall or other obstruction. To permit cooling air to circulate around and *through* the chassis, horizontal installation requires that the chassis be raised from the mounting shelf with wood cleats, while vertical installation requires the cleats, a vented mounting board, and a fan capable of delivering at *least* 65 cubic feet of air per minute. If you install another heat-producing component in the same cabinet (amplifier, tape recorder, etc.), mount it above or next to the FISHER, *never* below it (in horizontal installation) or in front of it (vertical installation). In any event, the air temperature in the area of the chassis should not exceed 40° Centigrade or 104° Fahrenheit.

FAILURE TO OBSERVE THESE PRECAUTIONS WILL VOID ALL WARRANTIES ON THIS UNIT.

HORIZONTAL INSTALLATION

(1) Materials Required:

- 2 12-inch wood cleats cut from ¾-inch square stock.
- 2 1-inch flat-head wood screws.
- 4 8-32 machine screws with ⅜-inch washers (1½ inches long for mounting shelves up to ½ inch thick; 1¾ inches long for shelves up to ¾ inch thick).

(2) Figure 4a is an overall view of the horizontal installation. The chassis (with feet removed) will fit through the cutout in the cabinet's front panel and will rest on the cleats ¾ inch *above* the mounting shelf. Note that the lower edge of the cutout lines up exactly with the tops of the cleats.

(3) On the inside of the cabinet's front panel, draw a horizontal line exactly ¾ inch above the mounting shelf. This represents the bottom edge of the front-panel cutout shown in Figure 4b. Determine where along the front panel you wish to install the chassis and, using Figure 4b as a guide, make the cutout in the panel.

(4) Position cleats 1 and 2 as shown in Figure 4c with their front ends tight against the inside of the cabinet's front panel. Fasten the cleats to the mounting shelf with the flat-head wood screws at points "A". If possible, insert the screws from the underside of the shelf; if you must drive the screws from above, countersink the screw heads below the top surfaces of the cleats.

(5) Measuring from the *outer* surface of the front panel, locate and drill four 5/16-inch holes through the cleats and shelf at points "B" in Figure 4c. Insert one of the 8-32 machine screws through one of these holes from the underside of the mounting shelf to make sure that the screw does *not* protrude more than ¼ inch above the cleat. Greater lengths may damage delicate parts or cause short-circuits inside the chassis. Use extra washers, if necessary, to take up excess length. To provide additional ventilation to the underside of the chassis, you may, if you wish, cut the optional vent hole in the shelf as shown.

(6) Unscrew the four plastic feet from the underside of the chassis, but keep them in case you want to use the chassis on an open shelf or table in the future. These feet *must* be re-installed in such cases. Slide the chassis into the cutout until the set's control panel is tight against the cabinet's front panel and hides the rough edges of the cutout.

(7) Insert the four appropriately sized machine screws (with extra washers, if necessary) into the holes on the underside of the mounting shelf and fasten the chassis into place. Remember, make sure that the screws do not penetrate more than ¼ inch.

VERTICAL INSTALLATION

(1) Materials Required:

- 1 chassis mounting board, cut from ¾-inch plywood to dimensions specified in the following instructions.
- 2 12-inch wood cleats cut from ¾-inch square stock (cleats 1 and 2).
- 2 12⅞-inch wood cleats cut from 1-inch square stock (cleats 3 and 4).
- 2 1-inch flat-head wood screws.
- 4 8-32 X 1¾-inch machine screws with ⅜-inch washers. Do *not* use longer screws; they may damage delicate parts or cause short-circuits in the chassis.
- 14 No. 8, 1¼-inch round-head wood screws.
- 1 low-noise fan rated at 65 CFM minimum (Rotron Whisper Fan or equivalent).

(2) Measure the inside height of the cabinet and compare this height with the overall depth of the chassis (*rear* of control panel to rearmost projection such as fuse post, loop antenna, etc.). The cabinet must be high enough to provide *at least* the 4-inch clearance between the chassis and the bottom of the cabinet shown in Figure 5a. Also, make sure that there will be enough room in front of the mounting board for the fan.

(3) Measure the inside width of the cabinet (or mounting compartment) as shown in Figure 5b. Cut the ¾-inch plywood mounting board so that it is ¼-inch narrower than the inside width of the cabinet; this will provide the necessary ⅛-inch clearance at each edge as shown. The depth of the board should be an inch or two greater than the overall depth of the chassis.

(4) Determine where along the cabinet's top panel you want to install the chassis and check beneath the panel for obstructions. Saw a cutout in the top panel to the dimensions shown in Figure 5b. Make a pencil mark at the mid-point of one of the long sides of the cutout.

(5) Hold the mounting board flat against the underside of the cabinet's top panel. Position the board so that it clears each side wall of the cabinet (or mounting compartment) by the required ⅛ inch. Extend the pencil mark at the edge of the cutout across the exposed part of the mounting board. Using this pencil mark as the center-line reference, position the two 12-inch cleats (cleats 1 and 2) as shown in Figure 5c with their forward ends lined up with the top edge of the mounting board. Fasten the cleats to the board with the two flat-head wood screws at points "A". If you drive the screws through the cleats from above, countersink the screw heads below the top surfaces of the cleats.

(6) Hold the mounting board in the cabinet vertically as shown in Figure 5c so that its top edge is tight against the underside of the cabinet's top panel. Measuring from the *outer* surface of the top panel, locate and drill four 5/16-inch holes through the cleats and board at points "B", cut away the top corners of the board as shown, and locate and cut the vent hole. **This hole is *mandatory* for vertical installation.**

(7) Drill three 3/16-inch pilot holes through each 12⅞-inch cleat (cleats 3 and 4). The middle hole in each cleat should be midway between the ends, the outer holes about ½ inch from each end.

(8) To determine the locations of cleats 3 and 4, place the mounting board in the cabinet *vertically* so that cleats 1 and 2 line up with the forward edge of the cutout as shown in Figure 5b. Measure the distance between this edge of the cutout and the forward edge of the mounting board as shown in the illustration; do this on both side walls of the cabinet (or mounting compartment) and make pencil marks at the appropriate locations.

(9) Hold cleat 3 at its appropriately marked location on one of the inside walls of the cabinet (or mounting compartment). Make sure that the cleat is perpendicular to the top panel and about ½ inch below it. Using the three pilot holes in the cleat as guides, locate and drill three 1/16-inch pilot holes in the side wall of the cabinet, about ¼ inch deep. Repeat this for cleat 4. Fasten both cleats inside the cabinet with six No. 8 round-head wood screws.

(10) Mount the fan as shown so that its axis will point at the center of the vent hole on the mounting board. You may fasten the fan to a separate mounting board or to standoffs on the chassis mounting board, but make sure that it is no more than 4 inches from the main board and that it will blow air *towards* the chassis.

(11) Place the mounting board in the cabinet vertically so that its front surface is tight against cleats 3 and 4 and its top edge is tight against the underside of the cabinet's top panel. Check that cleats 1 and 2 still line up with the forward edge of the cutout. Locate four 3/16-inch pilot holes near the left edge of the board and four more near the right edge so that they will guide the remaining wood screws into cleats 3 and 4 without hitting the screws already in the cleats. Drill the holes in the board *only* and fasten the board into place with eight No. 8 round-head wood screws.

(12) Unscrew the four plastic feet from the underside of the chassis, but keep them in case you want to use the chassis on an open shelf or table in the future. These feet *must* be re-installed in such cases. Lower the chassis into the cabinet's top-panel cutout. Insert four 8-32 machine screws with washers through the 5/16-inch holes in the mounting board (by reaching around and under the board) and fasten the chassis into place.

(13) Connect the fan's power cord to an accessory electrical outlet on the *chassis.* THIS IS A MUST! It will ensure that the fan goes on whenever the set is switched on. If the fan has its own power switch, keep it ON permanently.

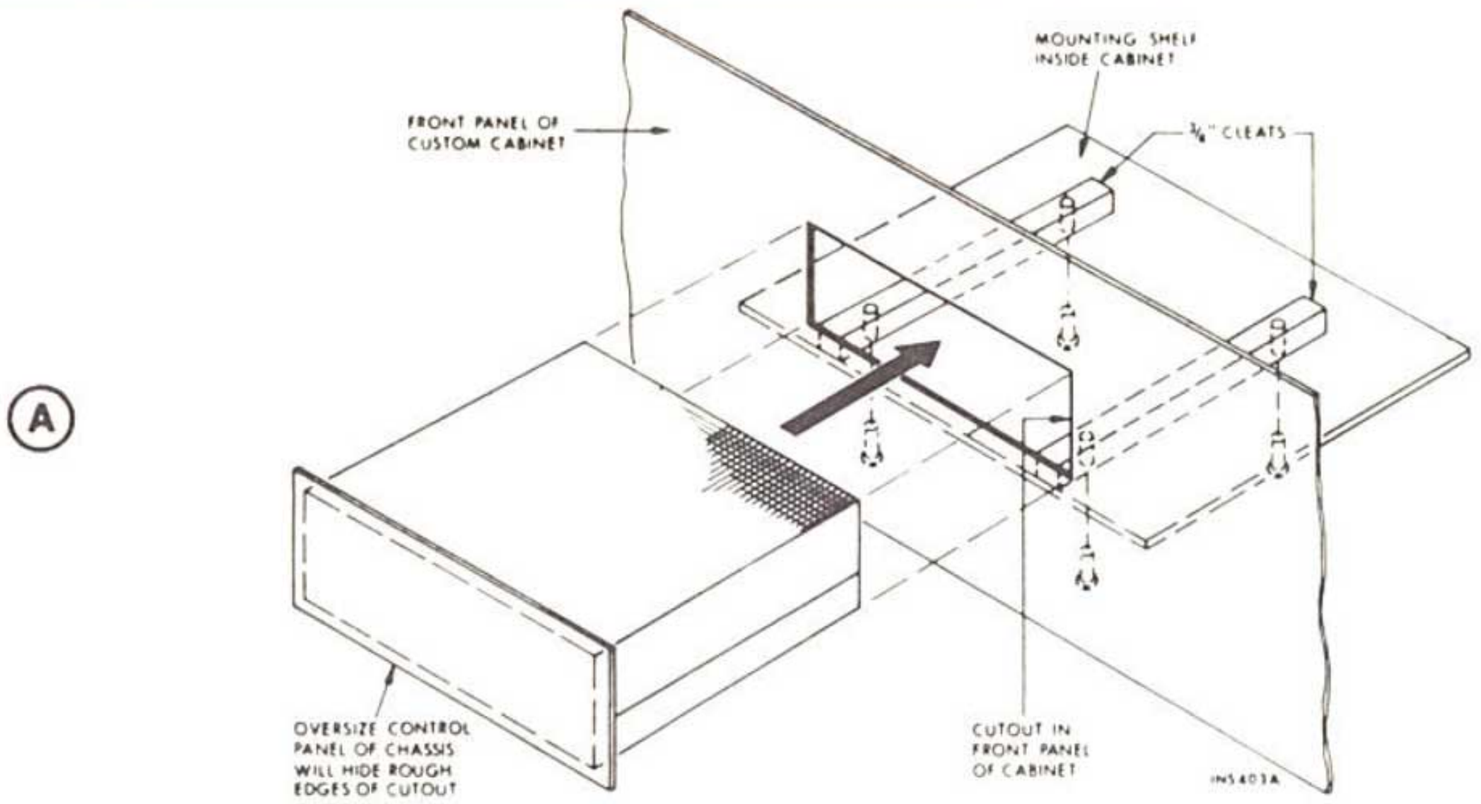
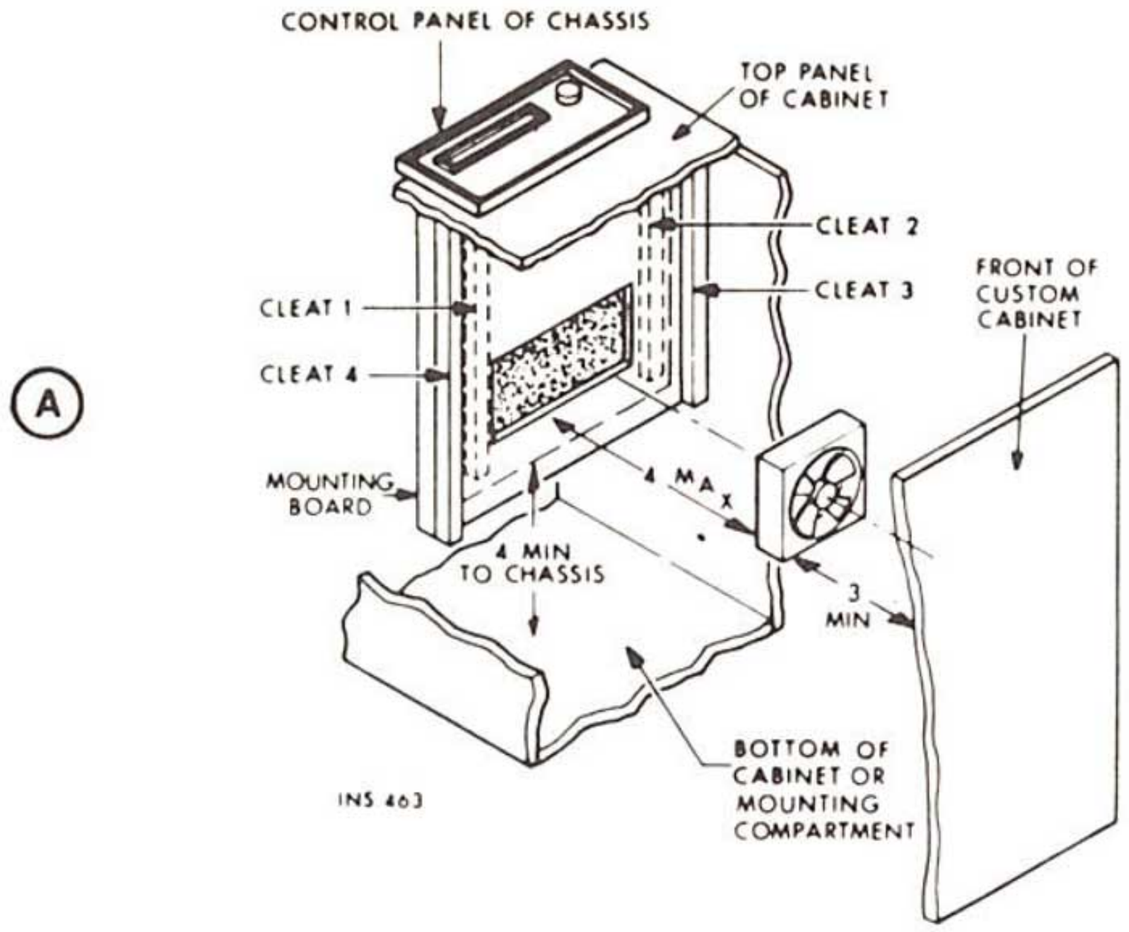
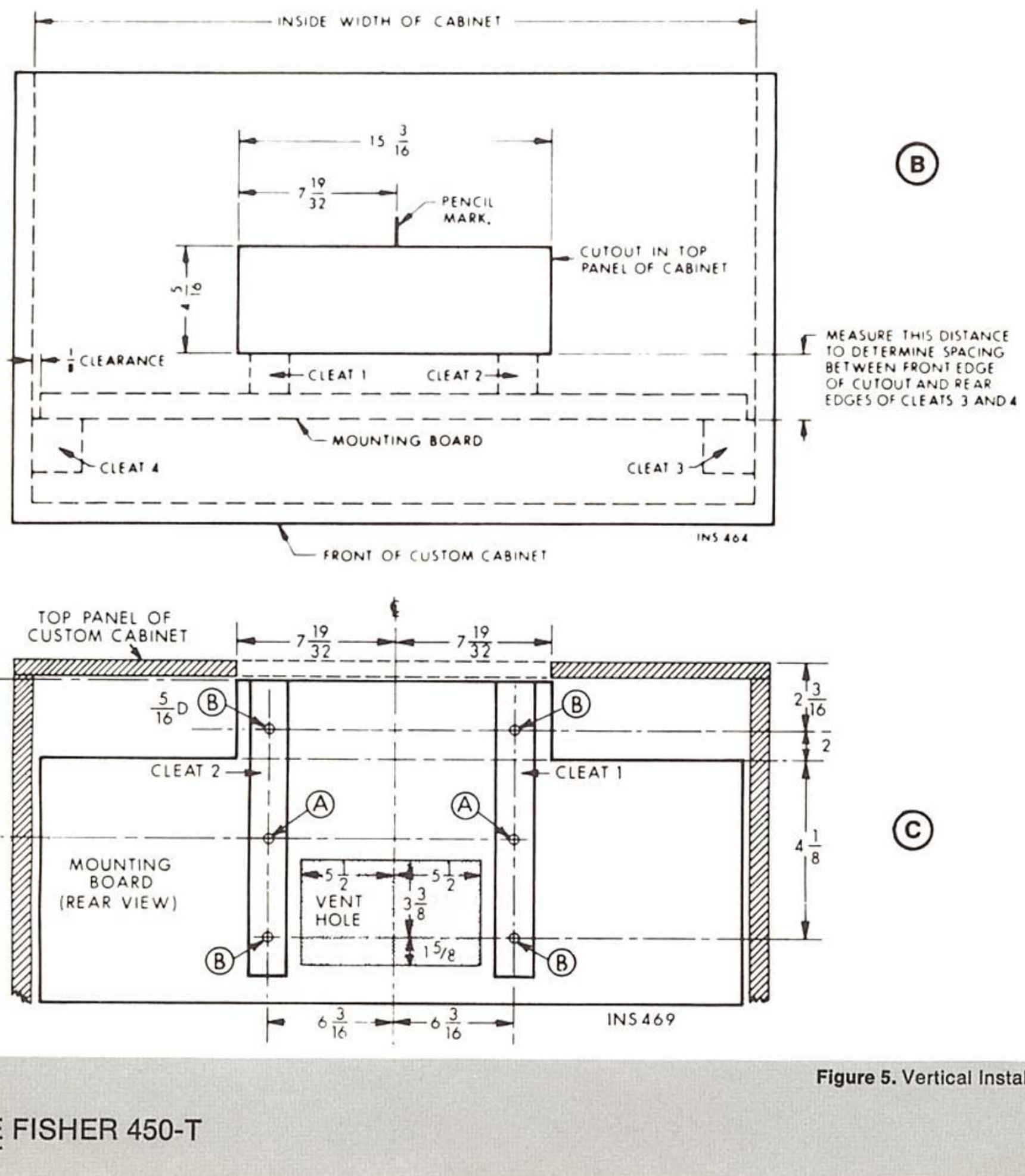


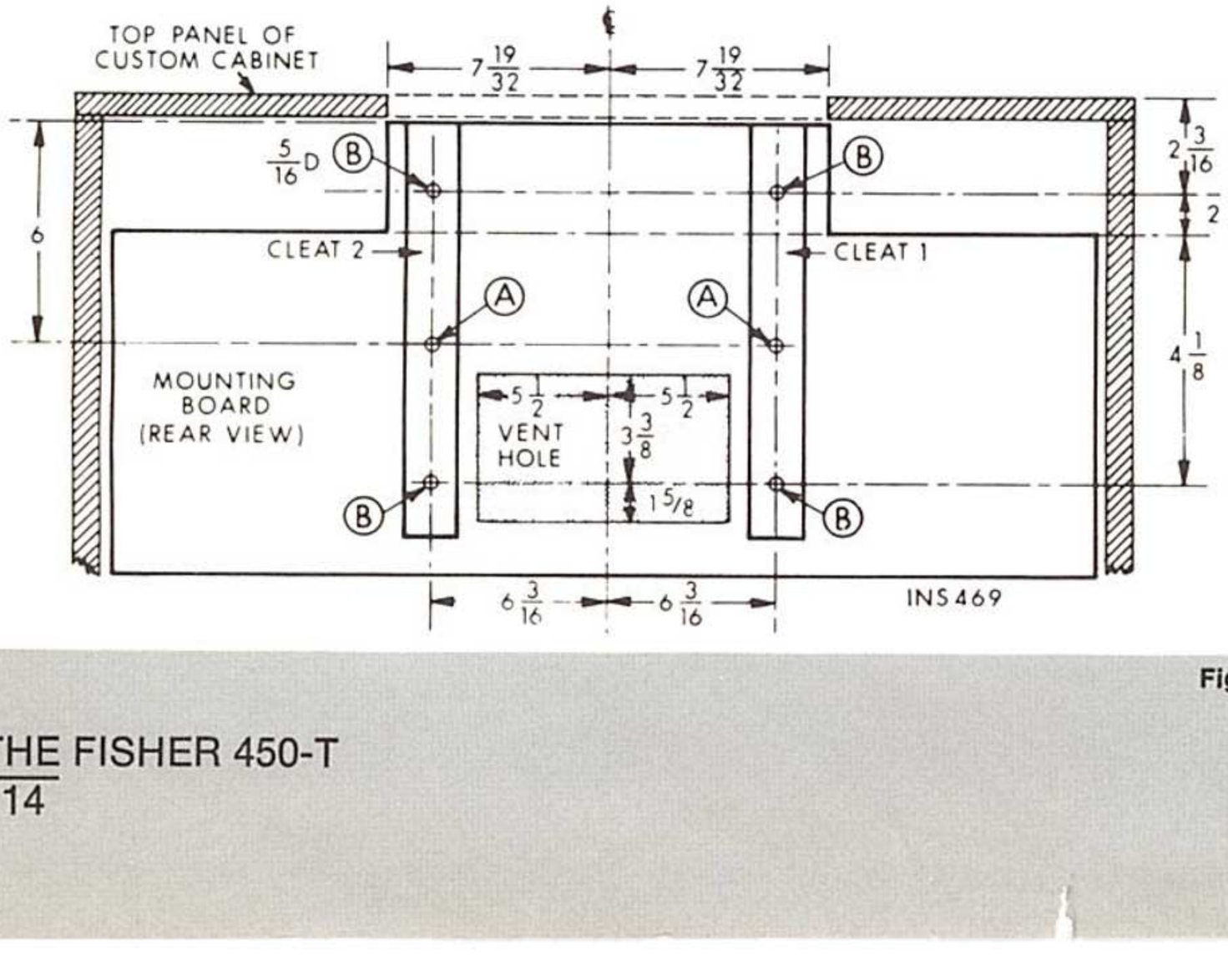
Figure 4. Horizontal Installation



A



B



C

Figure 5. Vertical Installation

MAINTENANCE

CAUTION: Turn off the receiver and disconnect its power cord from the electrical outlet whenever instructed to do so in the following procedures. Do *not* attempt any maintenance not listed in this section. For further service, consult your dealer, local FISHER Service Center, or: Service Department, Fisher Radio, 11-40 45 Road, Long Island City, New York 11101. (If returning a set for service, please do *not* include this manual, the Service Manual, or the dipole antenna.)

CLEANING THE CONTROL PANEL

The receiver's beautiful multitone control panel will retain its color and brilliance permanently. However, it is possible that, over a period of time, a film from atmospheric contamination may dull the surfaces. Simply use a soft, *freshly laundered* cloth moistened with *plain lukewarm water* and the panel will look new again. **Do not use any household or industrial cleaning agents, or any cloth that has been used to apply such agents.**

CLEANING THE DIAL GLASS

Remove dust from the *exposed* surface of the glass with a soft, dry, lint-free cloth. If you wish to clean more thoroughly, moisten the cloth with *plain lukewarm water* and gently wipe the glass back and forth until it is clean and free of streaks. **Do not attempt to remove the control panel or clean the rest of the dial glass; this can be done only by a qualified technician.**

SERVICING LAMPS

The STEREO BEACON, tuning-meter, dial and AUTO-SCAN lamps behind the control panel are long-life devices that should not require replacement in normal use. However, in the rare event that they should, do *not* attempt to replace them yourself; they are *not* customer serviceable. Consult your dealer, local FISHER Service Center, or Fisher Radio.

REPLACING THE POWER FUSE

The power fuse at the rear of the unit protects it against abormal power-line surges and overloads. If the set fails to operate when plugged in and turned on or if it suddenly becomes completely inoperative while playing (i.e., all dial and meter lamps go off and both channels are silent regardless of program source, speakers, or headphones selected), the fuse may have blown. Replace it as follows:

(1) Turn off the receiver and disconnect its power cord from the electrical outlet.

(2) On *domestic* sets, the fuse is in the black receptacle marked FUSE at the rear of the receiver (Figure 1). Turn the fuseholder cap to the left (in the direction of the arrow on the cap) until it disengages from the receptacle and remove the fuse from the cap. On *export* sets, the fuse is in the voltage-selector switch at the rear of the receiver. Using a screwdriver or coin, push *in* the slotted center part of the switch, turn the center part so that its red arrow lines up with the index slot on the lower right-hand part of the switch, and remove the fuse and cap from the receptacle.

(3) The spare fuse supplied with the set has a short spiral coil of wire inside its glass envelope (identifying it as a slow-blow type). Depending on the AC voltage for which your set is wired, one of the fuse's metal ends will be marked either ***3.2A*** or ***3.5A*** (for any voltage between 100 and 138 volts) or ***1.6A*** (for any voltage between 200 and 256 volts). Use only this fuse (or an exact commercial equivalent) as a replacement for the blown power fuse.

(4) Insert the replacement fuse in the fuse cap. Replace the cap in the receptacle by reversing the procedures in step 2. Connect the power cord to the electrical outlet and turn on the receiver.

CAUTION: If the unit still does not operate, or if it becomes inoperative within a short time, do not attempt to replace the fuse again. Consult your dealer, local FISHER Service Center, or Fisher Radio.

TECHNICAL SPECIFICATIONS

FM TUNER SECTION	
Usable Sensitivity (IHF Standard)	2.0 uV
Harmonic Distortion (at 400 Hz, 100% modulation)	0.5%
Signal-to-Noise Ratio (at 100% modulation and 1 mV input)	65 db
Selectivity, Alternate Channel	45 db
Spurious Response Rejection (at 100 MHz)	90 db
Image Frequency Rejection (at 100 MHz)	55 db
IF Frequency Rejection (at 100 MHz)	70 db
FM Stereo Separation (at 1 kHz)	38 db
Capture Ratio, IHF	2.5 db
AM TUNER SECTION	
Sensitivity	10 uV
Selectivity (at 1 MHz and ± 10 kHz)	50 db
Image Frequency Rejection (at 1 MHz)	40 db
IF Frequency Rejection (at 1 MHz)	55 db
AMPLIFIER SECTION	
Music Power (at 1 kHz) Speaker Impedance 8 ohms	180 watts ± 1 db
IHF Dynamic Power Speaker Impedance 8 ohms	65/65 watts
RMS Power (at 1 kHz) Speaker Impedance 8 ohms	55/55 watts
Harmonic Distortion (at 1 kHz)	0.5%
IM Distortion (60/7000 Hz, 4:1, SMPTE)	0.8%
Power Bandwidth, IHF (at 8 ohms)	10 to 30,000 Hz

Sensitivity (for rated output at 8 ohms)	
Phono Low	2.5 mV
Phono High	7.5 mV
Auxiliary 1 and 2	250 mV
Tape Monitor	160 mV
Recorder 1 and 2 Outputs (50% FM Mod.)	400 mV
Hum and Noise (below rated output)	
Volume at minimum	—90 db
Phono Low (6-mV reference)	—60 db
Auxiliary 1, 2 (400-mV reference)	—65 db
Frequency Response	
Phono Low	30 to 15,000 Hz ± 2 db
Auxiliary 1 and 2	20 to 25,000 Hz ± 2 db
Maximum Input Signal (at 1% THD)	
Phono Low	45 mV
Auxiliary 1 and 2	3.0 volts
Input Impedance	
Phono Low	50 k ohms
Auxiliary 1 and 2	200 k ohms
Tape Monitor	100 k ohms
Damping Factor (1 kHz)	greater than 30
Control Tracking Error (0 to —50 db)	Less than 2 db
Bass Control Range (at 50 Hz)	24 db
Treble Control Range (at 10 kHz)	24 db
Subsonic Filter	12 db per octave below 20 Hz
GENERAL	
Dimensions (including control panel and AM antenna)	15½" wide 4⅝" high 14¼" deep
Weight	25 lbs.
Power Consumption, Maximum	240 watts/320 VA

Hertz (Hz), Kilohertz (kHz), and Megahertz (MHz) have been used in this material to conform to the standards established by the IEEE. They replace cycles per second (cps), kilocycles (kc), and Megacycles (Mc), respectively.

NL4007-102

WARRANTY TO OWNER

All FISHER equipment is fully guaranteed to the original using purchaser against defects in materials and workmanship, subject to the following:

- All parts are guaranteed for two years. Any defective part will be repaired or replaced without charge. During the first ninety days there is no charge for warranty labor.
- Defective parts or equipment must be returned properly packed, transportation prepaid, to the FISHER dealer from whom it was originally purchased, or to a FISHER Authorized Service Center, or, after written authorization, to the FISHER plant. All warranty service is F.O.B. the dealer, service center, or FISHER plant.
- The warranty is void if our inspection shows that the equipment has been tampered with, or installed, altered or repaired at variance with factory-designated procedures, subjected to negligence, misuse or accident, damaged by excessive line voltage or insufficient ventilation, or had its serial number altered, defaced or removed.

This warranty is in lieu of all other warranties, express or implied, and all other obligations or liabilities on the part of FISHER. No person, including any dealer, agent or representative of FISHER, is authorized to assume for FISHER any liability on its behalf or in its name except to refer purchasers to this warranty.

This warranty takes effect only if the warranty-registration card has been fully and properly filled out and returned to FISHER RADIO within ten (10) days from the date of purchase.

Be sure to Register Your FISHER Equipment and Enjoy the Following Advantages:

■ Full benefits of the FISHER warranty. ■ Prompt handling of correspondence with our Customer Service Department. ■ Assistance in finding your equipment or establishing its value in case of loss through theft, fire, etc.

FOR WARRANTY SERVICE, CONSULT YOUR DEALER

AVERY FISHER, *Founder and President, Fisher Radio*

THE MAN BEHIND THE PRODUCT

More than 30 years ago, Avery Fisher introduced America's first high fidelity radio-phonograph. That instrument attained instant recognition, for it opened a new era in the faithful reproduction of records and broadcasts. Some of its features were so basic that they are used in all high fidelity equipment to this day. One of these models is now in the permanent collection of the Smithsonian Institution as an example of the earliest high fidelity instruments commercially available in this country.

The engineering achievements of Avery Fisher and the world-wide reputation of his products have been the subject of descriptive and biographical articles in Fortune, Time, Pageant, The New York Times, Life, Coronet, High Fidelity, Esquire, The Atlantic, and other publications. Benefit concerts for the National Symphony Orchestra in Washington and the Philadelphia Orchestra, demonstrating recording techniques, and the great advances in the art of music reproduction, used FISHER high fidelity instruments both for recording and playback, to the enthralled audiences. FISHER equipment formed the key part of the high fidelity demonstration at the American National Exposition in Moscow, July 1959. FISHER FM and FM-AM tuners are the most widely used by broadcast stations for monitoring and relay work, and by research organizations—under conditions where absolute reliability and maximum sensitivity are a 'must.'

The FISHER instrument you have just purchased was designed to give you many years of pride and enjoyment. If you should desire information or assistance on the installation or performance of your FISHER, please write directly to President, Fisher Radio, L.I.C., N.Y. 11101.

FISHER RADIO • LONG ISLAND CITY • NEW YORK 11101

PLACE
STAMP
HERE

FISHER RADIO

11-40 45th Road

Long Island City, N.Y. 11101

FILL OUT THIS CARD

SAVE FOR REFERENCE

For FACTORY SERVICE and REPLACEMENT PARTS

Write or Call

Service Department, **FISHER RADIO**

11-40 45th Road • L. I. City, N. Y. 11101

(212) 937-2100

NOTE: FISHER replacement parts are taken from the original production supplies used in the manufacture of your equipment, and are therefore identical in every respect to the original.

For prompt attention, give the following information when writing us.

MODEL_____ **SERIAL NO.**_____ **PURCHASE DATE**_____

PLACE
STAMP
HERE

FISHER RADIO

11-40 45th Road

Long Island City, N.Y. 11101

Gentlemen:

I have received the descriptive folders on THE FISHER High Fidelity Equipment. I believe this literature will also be of interest to those of my friends whose names are listed below.

PLEASE PRINT

My name_____

Address_____

City_____ State_____

Please send copies of your literature to:

Name_____

Address_____

City_____ State_____

Name_____

Address_____

City_____ State_____

Name_____

Address_____

City_____ State_____

☐ You may use my name.

☐ Please do not use my name.

IMPORTANT! PROTECT YOUR PURCHASE!

THIS WARRANTY IS VOID UNLESS COMPLETED AND RETURNED WITHIN 10 DAYS AFTER DATE OF PURCHASE.

As a Fisher owner, you are entitled to all the benefits and advantages of the unique Fisher warranty. Protect your purchase by filling out the warranty card immediately. Mail today.

WE WILL BE GLAD TO MAIL YOUR FRIENDS DESCRIPTIVE LITERATURE IF YOU WILL SEND US THEIR NAMES AND ADDRESSES BELOW.

PROTECT YOUR PURCHASE!

PLEASE COMPLETE AND RETURN THIS

WARRANTY CARD

PLEASE PRINT

USER'S LAST NAME	FIRST NAME	INITIAL
USER'S HOME ADDRESS		
CITY	STATE	ZIP

MODEL NO.	DATE OF PURCHASE	SERIAL NO.
	· ·	11102

Name of Dealer_____

We would appreciate your reply to these questions.

Have you read the FISHER Handbook? ☐ Yes ☐ No

My purchase was influenced by:

☐ Dealer ☐ Friend

☐ Newspaper adv. Paper:_____

☐ Magazine adv. Magazine:_____

☐ Radio adv. Station:_____

☐ TV adv. Station:_____

I chose the FISHER because_____

What I think of my FISHER equipment_____

_____ ☐ You may quote me.