

OPERATING INSTRUCTIONS

THIS MANUAL ALSO COVERS THE 800-T RECEIVER

N1664-202



THE FISHER®

500-TX™

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 appearance, 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. | 1955 First correctly equalized, direct tape-head preamplifier with self-powered master audio control. | 1964 First FM Stereo Tuner with STEREOSCAN®. |
| 1937 First exclusively high-fidelity TRF tuner, featuring broad-tuning 20-20,000 cycle fidelity. | 1956 First all-transistor preamplifier-equalizer. | 1964 First peripherally-driven tweeter with soft dome. |
| 1937 First two-unit high-fidelity system with separate speaker enclosure. | 1955 First dual dynamic limiters in an FM tuner for home use. | 1964 First FM tuner with TUNE-O-MATIC® circuitry. |
| 1938 First coaxial speaker system. | 1956 First performance monitor in a high-quality amplifier. | 1965 First All-in-One, All-Transistor 4-Gang Front-End. |
| 1933 First high-fidelity tuner with amplified AVC. | 1957 First GOLDEN CASCODE FM tuner. | 1966 First F.E.T. front-end design with over 40 db of Automatic Gain Control. |
| 1939 First dynamic range expander. | 1957 First MicroRay tuning indicator. | 1966 First FM tuner with Automatic RF Attenuator. |
| 1939 First 3-way speaker in a high-fidelity system. | 1958 First stereophonic radio-phonograph with magnetic stereo cartridge. | 1966 First FM tuner to achieve 0.6 db capture ratio—three times better than the best previous achievement. |
| 1939 First center-of-channel tuning indicator. | 1959 First high-quality remote control system. | 1966 First FM Tuner to use a 10-megacycle-wide Counter Detector, eliminating distortion for the life of the set. |
| 1945 First preamplifier-equalizer with selective phonograph equalization. | 1959 First complete stereophonic FM-AM receiver. | 1966 First FM Tuner with Clear Signal Indicator. |
| 1948 First dynamic range expander with feedback. | 1959 First high-compliance plus high-efficiency Free-Piston loudspeaker system. | 1966 First FM Tuner to incorporate a Power Amplifier Circuit for high-quality, low-impedance headphones. |
| 1949 First FM-AM tuner with variable AFC. | 1960 First to use MicroRay for FM tuning and as a recording audio level indicator. | 1966 First time-division multiplex circuit to incorporate a Four-Diode Coincidence Circuit. |
| 1952 First 50-watt all-triode amplifier. | 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. | 1966 First Receiver with <i>Transist-O-Gard</i> ® protection. |
| 1952 First self-powered master audio control. | 1960 First reverberation device for use in high fidelity equipment—the Fisher Dynamic Spacexpander®. | 1967 First to introduce high fidelity equipment with seven integrated circuits (IC's). |
| 1953 First self-powered, electronic sharp-cutoff filter system for high-fidelity use. | 1960 First stereo tuner with MicroTune®. | 1967 First loudspeaker system with 18" free-suspension bass speaker. |
| 1953 First universal horn-type speaker enclosure for any room location and any speaker. | 1961 First FM-Stereo multiplex adapter with STEREO BEACON® and automatic mono-stereo switching. | 1968 First receiver with AUTOSCAN®—totally silent <i>electronic</i> touch tuning—and TUNE-O-MATIC® pushbutton electronic tuning. |
| 1953 First FM-AM receiver with a cascode front end. | 1961 First complete FM-multiplex stereo receivers. | 1968 First and only FM tuner with a dual gate MOSFET, achieving dynamic range, on signal strength, of 1,000,000 to 1. |
| 1954 First low-cost electronic mixer-fader. | 1961 First FM-stereo tuners with STEREO BEACON® and STEREO BEAM. | 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). |
| 1954 First moderately priced professional FM tuner with two meters. | 1961 First internal switching system to permit immediate tape playback with use of all controls and switches. | 1969 First receiver with sequential AUTOSCAN® signal seeking. |
| 1955 First peak power indicator in high fidelity. | 1962 First woofer with eddy-current-damped voice coil. | 1969 First bookshelf speaker system with 15" free-piston woofer in a compact enclosure. |
| 1955 First master audio control chassis with five-position mixing facilities. | 1963 First power amplifier to use oscilloscope-type frequency-compensated input circuit. | |



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Your new FISHER 500-TX is a highly advanced 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 a dual-gate-FET front end with TUNE-O-MATIC® and AUTOSCAN station selection and an extremely selective crystal IF filter, an integrated-circuit IF amplifier, and a multiplex decoder with exclusive STEREO BEACON*.

While relatively simple to operate, the 500-TX 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, plus any one of a wide variety of auxiliary sources of your choice. (Special facilities are also included for adding reverberation with the FISHER K-10 DYNAMIC SPACEEXPANDER®, for tape-recording the selected program while listening, and for playing *back* the recording—or any prerecorded tape—through the receiver at your convenience.) Whatever the program, the unit's complete array of controls and switches enable you to shape its sound characteristics to suit your personal tastes and listening conditions, while also providing selective listening through any desired combination of main speakers, optional center and remote speakers, and conveniently connected stereo headphones. In all cases, the 500-TX'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 500-TX, 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.

**Patent Pending

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!

1 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.

2 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 90-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.

3 AM AND FM ANTENNAS

Remove the tape from the AM antenna and let it swing down into its receiving position. **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 *non-metallic* 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.

4 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 for each wire. This will help you to 'phase' the speakers in step c.

(c) Connect the speaker at the left 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).**

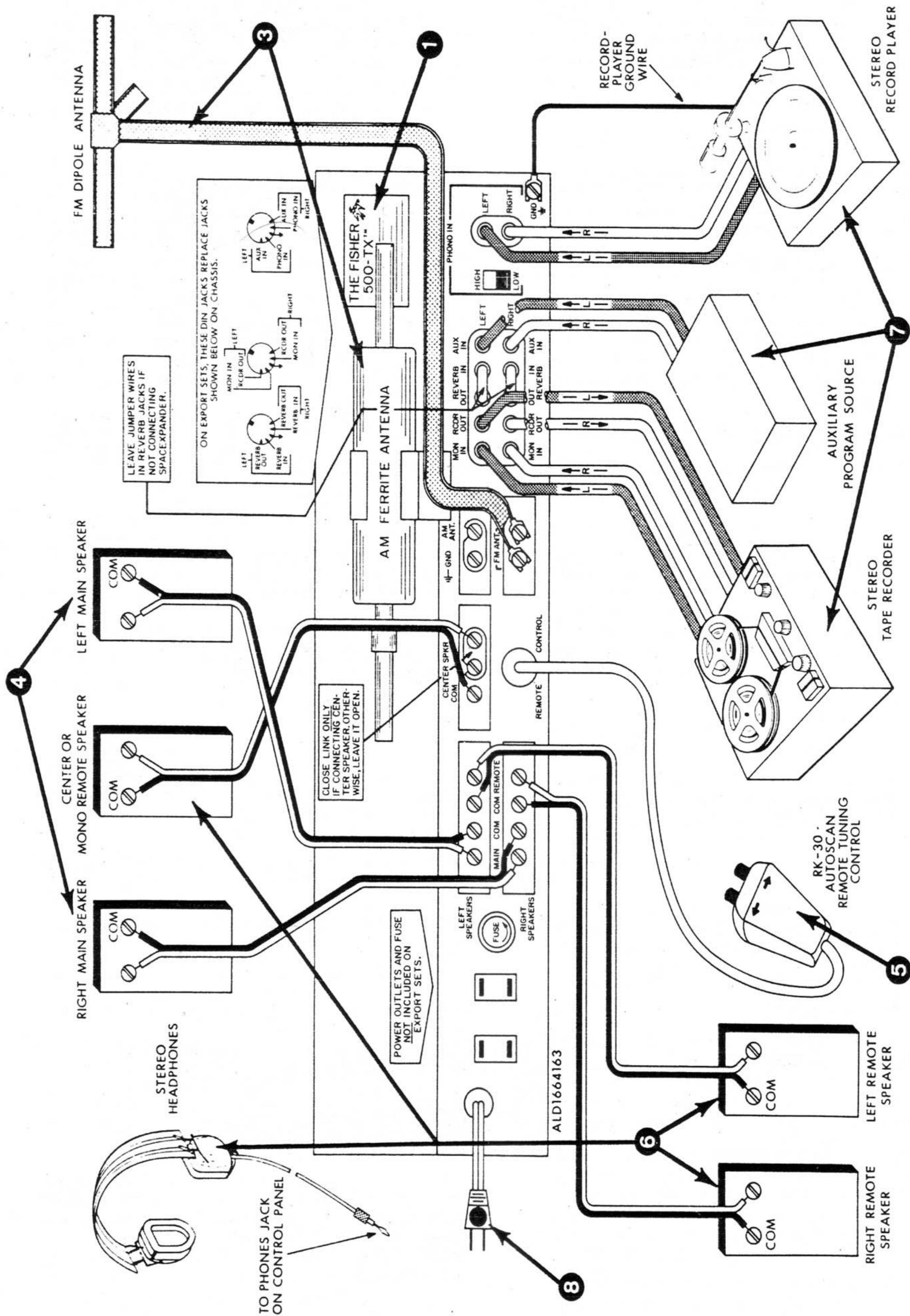


Figure 1. Receiver Connections

Later on, when operating the receiver, check for correct phasing by playing an FM program with the MODE/TAPE MONITOR switch at MONO. 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 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 set the receiver's MODE/TAPE MONITOR switch to MONO and turn the BALANCE control fully to the left. Keep these controls in these positions until you connect a second speaker.

5 REMOTE TUNING CONTROL

The REMOTE CONTROL jack at the rear of the receiver provides convenient means for plugging in the FISHER RK-30 AUTOSCAN Remote Tuning Control. This compact accessory, available at your dealer, enables you to tune in any FM station from your listening position up to 12 feet from the set.

6 HEADPHONES AND EXTRA SPEAKERS

To augment your main speakers, provisions have been

included for connecting a set of stereo headphones (for private listening), a center speaker (for three-speaker stereo in the main room or for mono listening in a second room), and a pair of remote extension speakers (for stereo listening in still another room). Please refer to the *HEADPHONES AND EXTRA SPEAKERS* section.

NOTE: Leave the link between the right-hand and middle CENTER SPKR terminals *open* if you don't connect a center speaker.

7 ADDITIONAL COMPONENTS

The *ADDITIONAL COMPONENTS* section provides instructions for connecting a record player or changer to the receiver as well as an auxiliary program source, a tape recorder, deck or player, and the K-10 DYNAMIC SPACEEXPANDER®. 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.

8 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.

1 AC POWER SWITCH AND VOLUME CONTROL

Turn this control to the right (towards 10) until it clicks. The tuning dial 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.

2 SELECTOR SWITCH

Select the program source you want to hear (except tape; covered in item 3) by setting this switch to the appropriate position. (Note that the tuning meter lights whenever you switch to FM or AM, while the STEREO BEACON and MUTING lamps operate in FM only.)

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.

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 5 for FM (and AM) tuning instructions.

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.

AUX — 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.

NOTE: While listening to the selected program source, you may simultaneously record it on an external tape recorder or deck connected to the receiver. Refer to the *ADDITIONAL COMPONENTS* section for details.

3 MODE/TAPE MONITOR SWITCH

The first two positions of this switch, MONO and STEREO, determine whether you will hear mono or stereo sound when listening to any program source chosen with the SELECTOR switch. **When listening to FM broadcasts (either mono or stereo), always keep the switch set at STEREO; 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 indicator at the left of the tuning dial will light whenever the set is in the FM-stereo mode.) For the rare exception to this, refer to *TUNING* (item 5).

When listening to a record or auxiliary program source, switch to STEREO if the particular program is stereophonic (so that you actually hear stereo sound) and to

MONO 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 switch is set to MONO or STEREO.**

Use the **STEREO TAPE, TAPE L, or TAPE R** positions only when *playing back or monitoring* tapes through the receiver from a tape recorder, deck or player connected to the **MON IN** jacks. (Refer to the **ADDITIONAL COMPONENTS** section for details.) Keep the switch in **MONO** or **STEREO** at all other times; otherwise, any program chosen with the **SELECTOR** will be silenced.

NOTE: When temporarily using only one speaker (as described in **INSTALLING THE RECEIVER**), always keep this switch set at **MONO** (or **TAPE L** when playing tapes) until you connect a second speaker.

4 SPEAKERS SWITCH

Normally, keep this switch set at **MAIN** to hear the selected program source through your main speakers. If you also connect a center (or mono remote) speaker to the receiver, set the switch to **MAIN + CENTER** when you want to hear the program through all *three* speakers. If you connect *stereo* remote speakers, set the switch to **REMOTE** when you want to listen through *them* instead. To play the program through your main and remote (or main, remote, and center) speakers *simultaneously*, set the switch to **ALL**.

When listening through headphones, you may *silence* all speakers by setting the switch **OFF**. (Even without headphones, this is a convenient way to silence your music system momentarily without shutting off the receiver or changing its **VOLUME** setting.) For further information, refer to **HEADPHONES AND EXTRA SPEAKERS**.

5 TUNING

Three alternate tuning methods are provided: continuous manual tuning for both **FM and AM**, **TUNE-O-MATIC**® for convenient pushbutton memory selection of up to four pretuned FM stations, and **AUTOSCAN** for ultra-precise *electronic* tuning up or down the FM band at the touch

of a button (either at the set or, with optional remote control, from your listening position). Each method is described in detail below. Please follow these instructions carefully.

NOTE: For best results in the **TUNE-O-MATIC** mode, please wait about 30 minutes after first turning on the set before attempting to pretune the numbered pushbuttons. We suggest that, in the interim, you tune FM stations either manually or with the **AUTOSCAN** pushbuttons.

Ⓐ **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, disregard steps 1 and 2.*

(1) On the **TUNE-O-MATIC** portion of the control panel, press in the *center tip* of the **MANUAL** pushbutton. This transfers control to the **MANUAL TUNING** knob and the main FM tuning dial. *On AM, this step is unnecessary.*

(2) Turn the *outer* part of the **MANUAL** pushbutton to **AFC OFF**. The red indicator in the adjacent window will disappear, signifying that the **AFC** (Automatic Frequency Control) circuits have been temporarily switched off. **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.** Then, *on FM only*, turn the *outer* part of the **MANUAL** pushbutton back to **AFC ON**. (The red indicator will reappear in the window, signifying that the **AFC** circuits are once again operating.) **Always remember to switch AFC OFF when tuning on the FM band and ON again when listening.**

(4) If the **STEREO BEACON** indicator 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, set the **MODE/TAPE MONITOR** switch to **MONO**; the blinking and interference

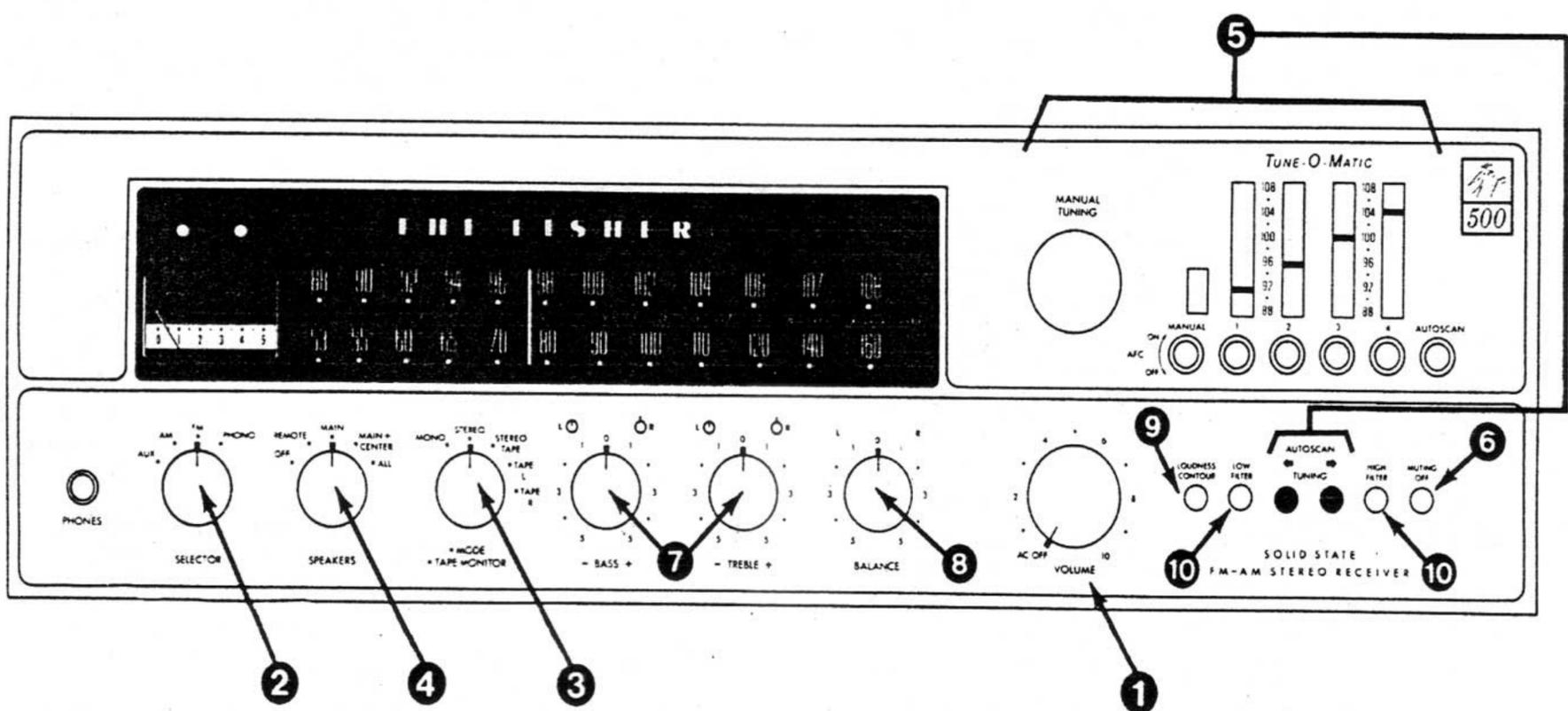


Figure 2. Control Panel of the Receiver

should stop and you can listen to the program monophonically. 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 reception on the AM band, refer to *AM ANTENNAS*.

ⓑ **TUNE-O-MATIC** — The TUNE-O-MATIC portion of the control panel has four individual FM tuning dials, each with a corresponding numbered pushbutton below it. All you need do (after allowing a 30-minute warm-up period) is pretune each pushbutton to one of your favorite FM stations. Then press in the appropriate pushbutton at any time to hear the station of your choice. Pretuning is quite simple and can be done as follows:

(1) Set the SELECTOR switch to FM and turn the *outer* part of the MANUAL pushbutton to AFC OFF. The red indicator in the adjacent window will disappear, signifying that the AFC (Automatic Frequency Control) circuits have been temporarily switched off. **Don't forget to do this; it's important for accurate tuning.**

(2) Press in the center tip of pushbutton 1 and turn the *outer* part of the pushbutton in either direction until you hear one of the stations you want. **Tune carefully for the highest possible reading on the 0-5 scale of the tuning meter (at the left of the main tuning dial) and for clear, undistorted sound with minimum interference from adjacent stations.** Note that the corresponding dial pointer will indicate the approximate broadcast frequency of the station, which is normally listed in your local newspaper.

(3) Press in pushbuttons 2 through 4 in sequence and carefully tune in a different station on each.

(4) Turn the *outer* part of the MANUAL pushbutton back to AFC ON. The red indicator will reappear in the window, signifying that the AFC circuits are once again operating. The set is now ready — just press in the appropriately numbered pushbutton for the station of your choice. The TUNE-O-MATIC pushbuttons' electrical 'memories' will retain their station settings indefinitely, even if you switch back and forth among the TUNE-O-MATIC, AUTOSCAN, and manual-tuning modes.

NOTE: If, when pressing in a pushbutton, you hear a loud rushing or 'whooshing' noise before the station comes in clearly, you haven't tuned properly. Temporarily turn the AFC OFF and retune the pushbutton. (You may, of course, retune any pushbutton to a different station at any time after the set has been on for 30 minutes, **but remember to switch AFC OFF when retuning and ON again when listening.**) 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, please refer to step 4 of *MANUAL TUNING*.

ⓒ **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 or down the FM band at the touch of the appropriate AUTOSCAN TUNING 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. In addition to its inherent precision, AUTOSCAN provides pushbutton convenience which can be extended to your listening position with the optional RK-30 Remote Tuning Control. Proceed as follows:

(1) Set the SELECTOR switch to FM. Press in the *center tip* of the AUTOSCAN pushbutton (directly to the *right* of the numbered TUNE-O-MATIC pushbuttons). This trans-

fers control to the two dark-colored AUTOSCAN TUNING pushbuttons (directly *below* the TUNE-O-MATIC pushbuttons) and lights the 88-108 AUTOSCAN scale of the tuning meter (at the left of the *main* tuning dial).

(2) The *left-hand* AUTOSCAN TUNING pushbutton controls *downscale* tuning towards 88 MHz, while the *right-hand* pushbutton controls *upscale* tuning towards 108 MHz (as indicated by their corresponding arrows). To tune station-by-station in either direction, press in the appropriate pushbutton fully and release it immediately—the set will tune to the first available station in the direction you've chosen and will lock on the *exact center-of-channel* for that station while indicating its approximate broadcast frequency on the tuning meter's AUTOSCAN scale. Note that the MUTING OFF pushbutton (item 6) in its normal *out* position completely silences the set during tuning.

(3) Should you want to *skip* several stations while tuning, simply *hold in* the appropriate pushbutton until the AUTOSCAN scale of the tuning 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—quickly press in and release the pushbutton until you reach the desired station. If you inadvertently 'overshoot the mark', simply tune back in the opposite direction with the *other* AUTOSCAN TUNING pushbutton.

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.

6 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; the MUTING lamp at the left of the main tuning dial will go off, indicating that the muting circuits have been temporarily disabled.

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 switching AFC OFF while listening. This will prevent the AFC circuits from 'pulling' towards the stronger station.

7 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', 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', 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.

8 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 this control turned fully to the left until you connect a second speaker.

9 LOUDNESS CONTOUR 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.

10 LOW FILTER AND HIGH FILTER BUTTONS

Normally, keep both buttons *out* for maximum-fidelity reproduction of all program sources. Press in the **LOW FILTER** button only when listening to a particular record, radio broadcast, tape, or other program source that is marred by rumble, hum, or other low-pitched noise. Similarly, if the program material is marred by objectionable hiss, scratch, or clicks, press in the **HIGH FILTER** button. The filters will reduce such interference without appreciably affecting the desired tones in the program material.

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 its 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 EXTRA 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 1/4-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 set the SPEAKERS switch OFF *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.

CENTER OR MONO REMOTE SPEAKER

The receiver's CENTER SPKR terminals (Figure 1) will provide a *monophonic* speaker output (with the link between the right-hand and middle terminals closed) whenever you set the SPEAKERS switch to MAIN + CENTER or to ALL. This output is a blend, or composite, of the left- and right-channel signals and may be used for either one of two purposes:

- To drive a 'center-fill' speaker in your main listening room if excessive main-speaker separation causes an exaggerated 'hole' in the middle of the stereo sound pattern.
- To drive a monophonic remote speaker in another room. If you choose this option and also connect *stereo* remote speakers, this will permit remote listening in two extra rooms (mono in one, stereo in the other).

(1) If you are using the speaker in the main listening room, place it midway between the main speakers and as close as possible to ear level. (The center speaker should be identical or similar to the main speakers for best results.) If you are using it as a mono remote

speaker, place it in any suitable spot in the remote location.

(2) If the speaker is 50 feet or less from the receiver, use the cable supplied with the speaker 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 the cable to the desired length but leave some slack in case you want to change speaker location 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 the 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 for each wire. This will help you to 'phase' the speaker properly in step 3.

(3) Close the link between the right-hand and middle CENTER SPKR terminals. Connect the speaker to the receiver as shown in Figure 1 and tighten all *three* terminals. If you are using the speaker in the main listening room, make sure that its COM, GND, C, G, or black terminal goes to the receiver's COM terminal. (The center speaker must be in phase with the main speakers for correct stereo perspective and good bass response.) If you are using it as a mono remote speaker, phasing is unimportant. In either case, make sure that the bare wires at the ends of the cable do not touch each other, adjacent terminals, or the receiver chassis.

NOTE: Should you ever disconnect the center speaker, remember to reopen the CENTER SPKR link and swing it out of the way.

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 set the SPEAKERS switch to REMOTE or ALL.

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 (SPEAKERS switch set to ALL).

(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 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. Set the SPEAKERS switch to REMOTE and the MODE/TAPE MONITOR switch to MONO and play a record or FM program through the receiver. 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, turn off the receiver and carefully reverse the connections at one of the speakers. Turn on the receiver and listen for normal bass.

(6) Set the MODE/TAPE MONITOR switch to STEREO and play a stereo record or FM program. Experiment with speaker placement until you find the permanent location that suits your personal tastes and listening conditions.

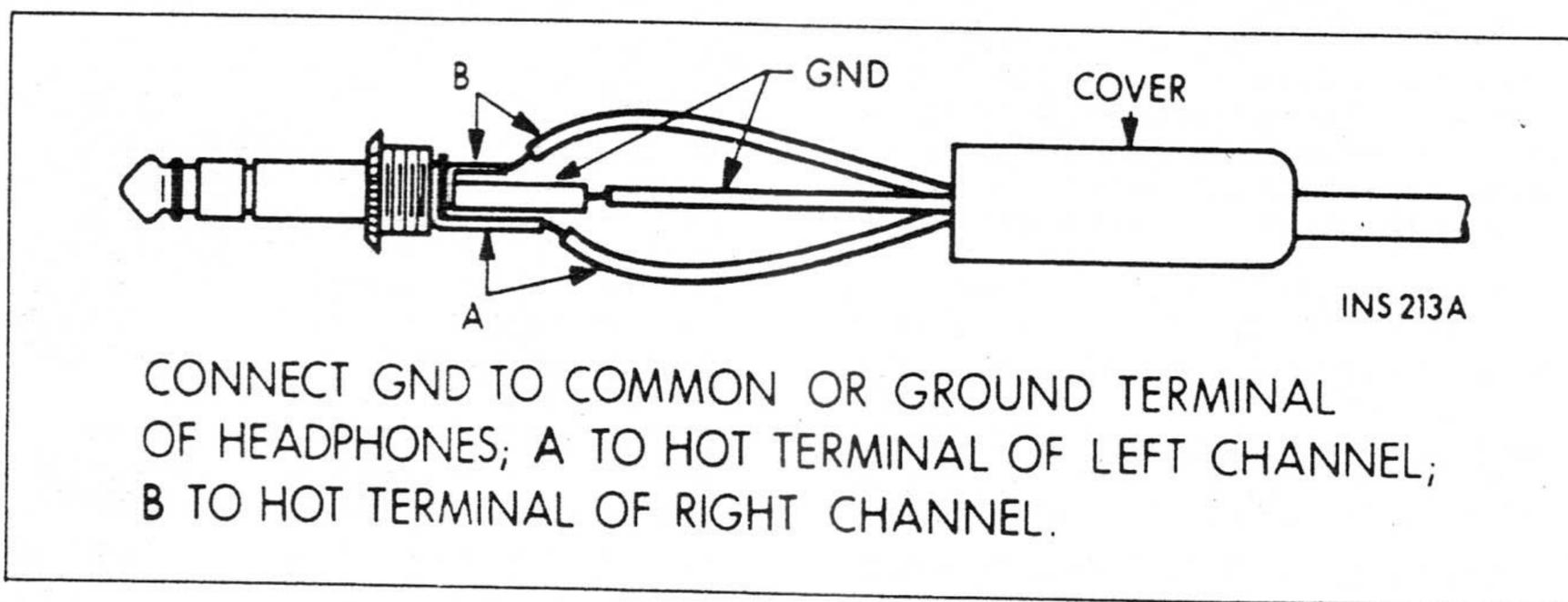


Figure 3. Headphone Plug Connections

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 IN 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 the MODE/TAPE MONITOR switch to STEREO. 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 rear of 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 may 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 IN 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 set the MODE/TAPE MONITOR switch to STEREO when playing stereo records and to MONO when playing mono records. All other controls may be adjusted in the usual manner to suit your personal tastes.

AUXILIARY PROGRAM SOURCE

You may increase the versatility of the receiver by playing an additional mono or stereo program source through its AUX IN jacks (Figure 1). Moreover, if the extra source normally plays through its own low-fidelity speakers and amplifiers, playing it through the receiver instead will improve its sound quality noticeably.

The auxiliary source may be an AM short-wave or multi-band tuner or receiver, the audio output of a TV set or sound-movie projector, an electronic organ, or any other similar device *so long as it has at least one medium- or low-impedance output jack providing about 250 mV to 4.5 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 the 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 the 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 the device, do not connect it to the receiver.**

(1) If the auxiliary device is monophonic (single channel) connect its single output jack to the receiver's left AUX IN jack; use a shielded cable with the appropriate connector 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 IN jack and the right output to the right AUX 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. If the auxiliary device is monophonic, set the receiver's MODE/TAPE MONITOR switch to MONO; if the device is stereophonic, set the switch to STEREO. Adjust the receiver's VOLUME control for a comfortable listening level.

(4) Turn the receiver's SELECTOR switch back and forth between AUX 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 auxiliary volume (as heard through the *receiver*), adjust them, if necessary, to equalize the volume levels.

TAPE RECORDER, DECK, OR PLAYER

Your receiver has provisions for connecting an external tape recorder or tape deck so that you may record any program source to which you are listening and then play back the recording (or any previously recorded tape) through the receiver at your convenience. (With some specially equipped stereo recorders or decks, the receiver 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 TAPE UNIT — Use the following instructions and Figure 1 to connect the tape unit to the receiver. *When connecting a player, ignore 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 connector at each end, connect this input to the receiver's left RCDR 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 OUT jack and the right input to the receiver's right RCDR OUT jack. **Never connect the receiver to any input(s) on the tape unit marked MIC., MICROPHONE, RADIO, or DIODE; the resultant recordings will be severely overloaded and 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 connector at each end, connect this output to the receiver's left 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 MON IN jack and the right output to the right 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.

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

(1) As usual, choose the desired program source with the receiver's SELECTOR switch and the appropriate listening mode with the MONO or STEREO position of the MODE/TAPE MONITOR switch; *the source to which you are listening is the source that will be recorded*. Follow the 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 MANUAL TUNING, TUNE-O-MATIC, or AUTOSCAN 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 stereo 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 MODE/TAPE MONITOR switch between STEREO (to hear the original program material as usual) and STEREO TAPE (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 switch at STEREO TAPE without affecting or interrupting the recording process in any way. **When you've finished recording, remember to set the MODE/TAPE MONITOR switch back to STEREO or MONO; otherwise, any program chosen with the SELECTOR will be silenced.**

PLAYBACK — To play back tapes from your recorder, deck, or player, simply set the receiver's MODE/TAPE MONITOR switch as follows:

(1) For stereo tapes, set the switch to STEREO TAPE.

(2) For mono tapes played on a mono machine, set the switch to TAPE L. This will permit you to hear the tape through both channels of the receiver.

(3) For multitrack mono tapes played on a stereo machine, set the switch to TAPE L or TAPE R to prevent playback of more than one track at a time. Which track you hear in a given switch position depends on the number of tracks recorded on the tape, on whether the machine is a 2- or 4-track unit, and on which way the tape is running through the machine. Refer to your tape unit's Instruction Manual for further details.

When you've finished playing tapes through the receiver, remember to set the MODE/TAPE MONITOR switch back to STEREO or MONO; otherwise, any program source chosen with the SELECTOR will be silenced.

DYNAMIC SPACEEXPANDER®

The FISHER K-10 DYNAMIC SPACEEXPANDER® 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 SPACEEXPANDER to the receiver, proceed as follows:

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

(2) Remove the jumper wires (or, on export sets, the jumper plug) that connect the REVERB IN and OUT jacks in each channel of the receiver, but keep them for future use in case you decide to disconnect the SPACEEXPANDER. **Either these jumpers or the SPACEEXPANDER must be connected to the IN and OUT jacks; otherwise, all program sources played through the receiver will be silenced.**

(3) Connect *one* of the SPACEEXPANDER's channel A INPUTS to the receiver's left-channel REVERB IN jack.

(4) Connect *one* of the SPACEEXPANDER's channel B INPUTS to the receiver's right-channel REVERB IN jack.

(5) Connect the SPACEEXPANDER's channel A OUTPUT to the receiver's left-channel REVERB OUT jack.

(6) Connect the SPACEEXPANDER's channel B or C OUTPUT to the receiver's right-channel REVERB OUT jack.

(7) Operate the SPACEEXPANDER as described in its Instruction Manual. Adjust all receiver controls in the usual manner to suit your personal tastes.

NOTE: If you are recording from the receiver while using the SPACEEXPANDER, the completed recording will also contain reverberation.

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 $\frac{3}{4}$ -inch square stock.
- 2 1-inch flat-head wood screws.
- 4 8-32 machine screws with $\frac{3}{8}$ -inch washers (1½ inches long for mounting shelves up to $\frac{1}{2}$ inch thick; 1¾ inches long for shelves up to $\frac{3}{4}$ 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 $\frac{3}{4}$ 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 $\frac{3}{4}$ 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 $\frac{1}{4}$ 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 $\frac{1}{4}$ inch.

VERTICAL INSTALLATION

(1) Materials Required:

- 1 chassis mounting board, cut from $\frac{3}{4}$ -inch plywood to dimensions specified in the following instructions.

- 2 12-inch wood cleats cut from $\frac{3}{4}$ -inch square stock (cleats 1 and 2).
- 2 12 $\frac{7}{8}$ -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 $\frac{3}{8}$ -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 $\frac{3}{4}$ -inch plywood mounting board so that it is $\frac{1}{4}$ -inch narrower than the inside width of the cabinet; this will provide the necessary $\frac{1}{8}$ -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.

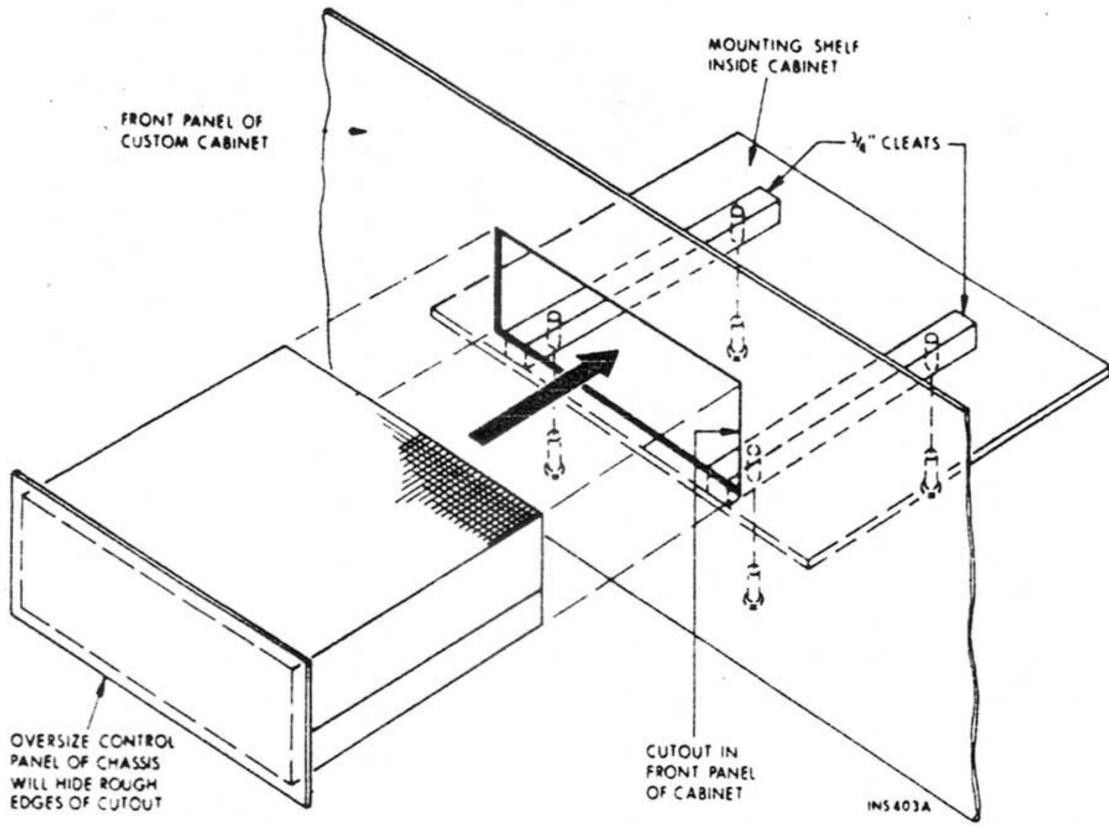
(4) Determine where along the cabinet's top panel you want to install the chassis and check beneath the panel for obstructions. Saw a cutout in the top panel to the dimensions shown in Figure 5b. Make a pencil mark at the mid-point of one of the long sides of the cutout.

(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 $\frac{1}{8}$ 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.

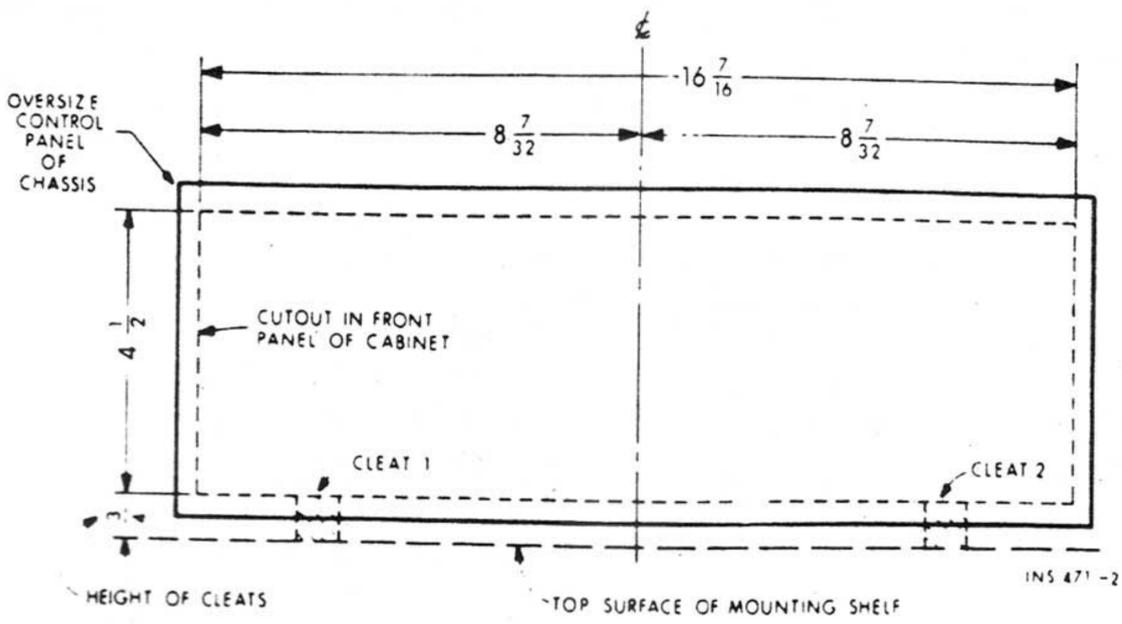
(6) Hold the mounting board in the cabinet vertically as shown in Figure 5c so that its top edge is tight against the underside of the cabinet's top panel. Measuring from the *outer* surface of the top panel, locate and drill four 5/16-inch holes through the cleats and board at points "B", cut away the 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 12 $\frac{7}{8}$ -inch cleat (cleats 3 and 4). The middle hole in each cleat should be midway between the ends, the outer holes about $\frac{1}{2}$ inch from each end.

(A)



(B)



(C)

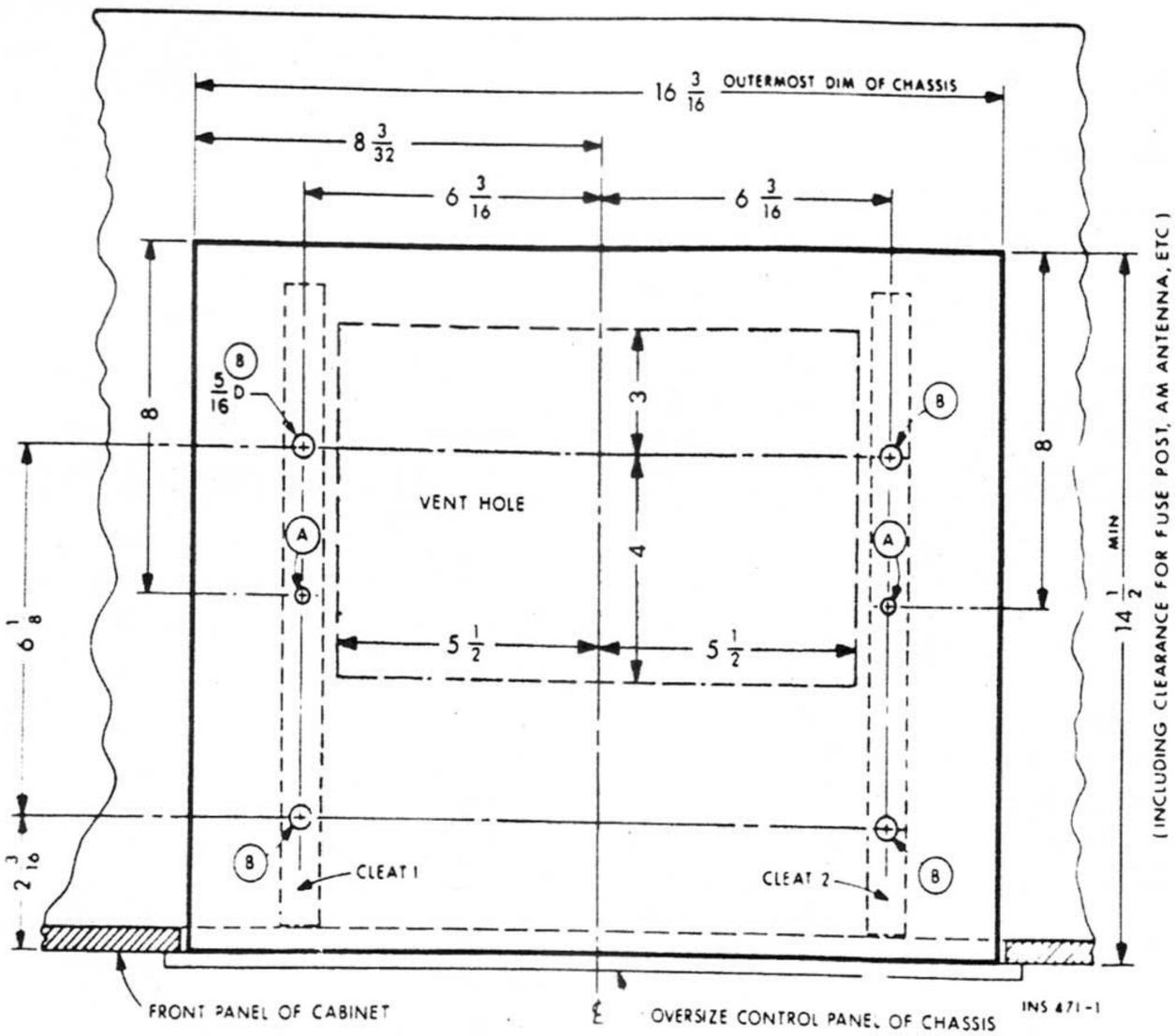


Figure 4. Horizontal Installation

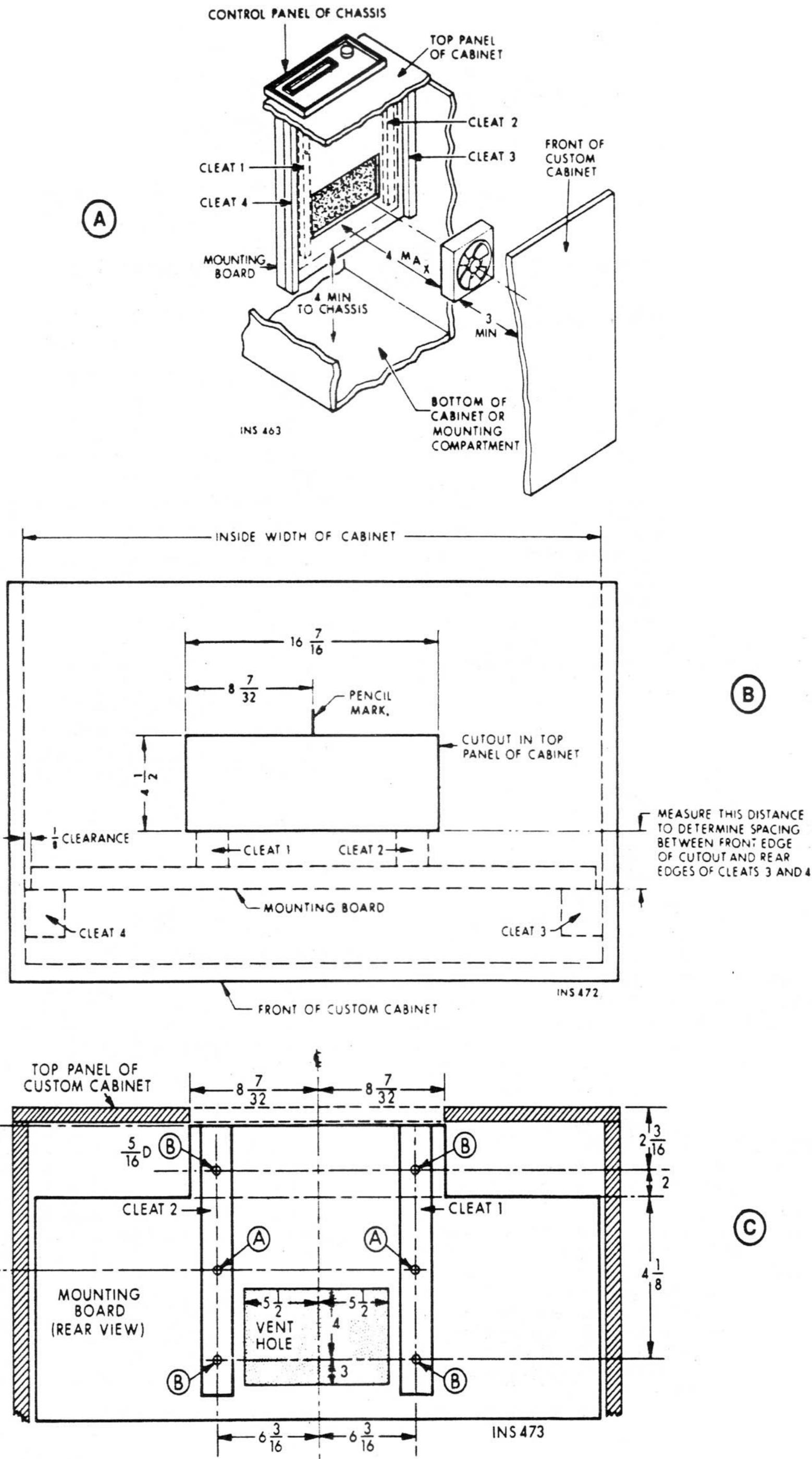


Figure 5. Vertical Installation

(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 $\frac{1}{2}$ inch below it. Using the three pilot holes in the cleat as guides, locate and drill three $\frac{1}{16}$ -inch pilot holes in the side wall of the cabinet, about $\frac{1}{4}$ 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 $\frac{3}{16}$ -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 $\frac{5}{16}$ -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.

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 Corporation, 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, MUTING, tuning-meter, and dial 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 abnormal 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) 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.

(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 $2A$ (for any voltage between 100 and 138 volts) or $1A$ (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. Push the cap into the receptacle and turn it to the right (against the direction of the arrow) until it is firmly in place. 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 Corporation.

TECHNICAL SPECIFICATIONS

FM TUNER SECTION

Usable Sensitivity (IHF Standard)	1.7 μ V
Harmonic Distortion (at 400 Hz, 100% modulation)	less than 0.4%
Signal-to-Noise Ratio (at 100% modulation and 1 mV input)	65 db
Selectivity, Alternate Channel	70 db
Spurious Response Rejection (at 100 MHz)	100 db
Image Frequency Rejection (at 100 MHz)	65 db
IF Frequency Rejection (at 100 MHz)	80 db
FM Stereo Separation (at 400 Hz)	38 db
Capture Ratio, IHF, at 1 mV	1.5 db

AM TUNER SECTION

Sensitivity	10 μ V
Selectivity (at 1 MHz and \pm 10 kHz)	80 db
Image Frequency Rejection (at 1 MHz)	70 db
IF Frequency Rejection (at 1 MHz)	65 db

AMPLIFIER SECTION

Music Power, IHF (at 1 kHz) Speaker Impedance 8 ohms	190 watts \pm 1 db
RMS Power (at 1 kHz) Speaker Impedance 8 ohms	65/65 watts
Harmonic Distortion (at 1 kHz)	0.5%
IM Distortion (60/7000 Hz, 4:1, SMPTE)	0.8%
Power Bandwidth, IHF (at 8 ohms)	8 to 35,000 Hz
Sensitivity (for rated output at 8 ohms)	
Phono Low	2.5 mV
Phono High	10.0 mV
Auxiliary	250 mV
Monitor	300 mV
Recorder Output (30% FM Mod)	400 mV

Hum and Noise

(below rated output)	
Volume at minimum	-90 db
Phono Low (6-mV reference)	-60 db
Auxiliary (400-mV reference)	-65 db

Frequency Response

Phono Low	30 to 15,000 Hz \pm 2 db
Auxiliary	20 to 25,000 Hz \pm 1.5 db
Power Amplifier Section	15 to 40,000 Hz \pm 1.5 db

Maximum Input Signal (at 1% THD)

Phono Low	50 mV
Auxiliary	4.5 volts

Input Impedance

Phono Low	50 k ohms
Auxiliary	175 k ohms

Damping Factor (1 kHz)

Speaker Impedance 8 ohms	greater than 30
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Control Tracking Error (0 to -50 db)

Less than 2 db

Separation (at 1 kHz, L to R, R to L)

Phono	greater than 45 db
Auxiliary	greater than 50 db

Bass Control Range (at 50 Hz)

24 db

Treble Control Range (at 10 kHz)

24 db

Subsonic Filter

12 db per octave below 10 Hz

Low-Frequency Filter (12 db per octave)

-3 db at 50 Hz

High-Frequency Filter (12 db per octave)

-3 db at 5,000 Hz

GENERAL

Dimensions (including control panel and AM antenna)

16 $\frac{7}{8}$ " wide
4 $\frac{13}{16}$ " high
14 $\frac{1}{2}$ " deep

Weight

30 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.

BECAUSE ITS PRODUCTS ARE SUBJECT TO CONTINUOUS IMPROVEMENT, FISHER RADIO CORPORATION RESERVES THE RIGHT TO MODIFY ANY DESIGN OR SPECIFICATION WITHOUT NOTICE AND WITHOUT INCURRING ANY OBLIGATION.

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*

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

THE MAN BEHIND THE PRODUCT

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.

This Unit is Adaptable to 4-Channel Sound

■ Please note that the recent introduction of four-channel program material for home listening does *not* obsolete your present two-channel stereo receiver or control amplifier in any way. You may continue to use it — as is — for high-quality stereo reproduction, *or you may expand to full four-channel playback capability at any time*, simply by adding an extra FISHER stereo control amplifier, two additional speakers, and a *true* four-channel program source such as the FISHER CP-100 Tape-Cartridge Player.

To play four-channel program material through this expanded system, first place the two additional speakers along, or near, the rear wall *behind* your normal listening position, and connect them to the extra control amplifier as shown in the illustration on the reverse side of this sheet.

Next, using the illustration as a guide, connect the four-channel program source's two *front*-channel outputs to your *present* receiver's or amplifier's AUX IN (or AUX/4-CH IN) jacks in the usual manner, and connect the two *rear*-channel outputs to the *extra* control amplifier's AUX IN (or AUX/4-CH IN) jacks. Then set both your present unit's *and* extra control amplifier's SELECTOR switches to AUX (or AUX/4-CH). (Note that we've graphically highlighted the four-channel adaptability of some FISHER units by relabeling their AUX IN jacks "AUX/4-CH IN", and their SELECTOR switches' AUX positions "AUX/4-CH".)

If you have any questions, please write to:

FISHER RADIO

Customer Relations Department

11-40 45 Road, Long Island City, New York 11101

HOW TO AUGMENT YOUR PRESENT STEREO SYSTEM FOR TRUE FOUR-CHANNEL REPRODUCTION

