OPERATING INSTRUCTIONS AND WARRANTY


# THE FISHER

## X-202-B

STEREOPHONIC

Master Control-Amplifier

WORLD LEADER IN HIGH FIDELITY

# 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. In fact, instruments we made over twenty-five years ago are still in use today.

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.

First high-fidelity sound systems featuring a beam-power amplifier, inverse feedback, acoustic speaker compartments (infinite baffle and bass reflex) and magnetic cartridges.
First exclusive high fidelity TRF tuner, featuring broad-tuning 20,000 cycle fidelity.
First two-unit high fidelity system with separate speaker enclosure.
First coaxial speaker system.
First high fidelity tuner with amplified AVC.
First 3-Way Speaker in a high fidelity system.
First Center-of-Channel Tuning indicator.
First Preamplifier-Equalizer with selective phonograph equalization.
First Dynamic Range Expander with feedback.
First FM-AM Tuner with variable AFC.
First 50-Watt, all-triode amplifier.
First self-powered Master Audio Control.
First self-powered, electronic sharp-cut-off filter system for high fidelity use.
First Universal Horn-Type Speaker Enclosure for any room location and any speaker.
First FM-AM Receiver with a Cascode Front End.
First low-cost electronic Mixer-Fader.
First moderately-priced, professional FM Tuner with TWO meters.
First Peak Power Indicator in high fidelity.
First Master Audio Control Chassis with five-position mixing facilities.
First correctly equalized, direct tape-head master audio controls and self-powered preamplifier.

**1956** First to use Power Monitor in a home amplifier.
**1956** First All-Transistorized Preamplifier-Equalizer.
**1956** First dual dynamic limiters in an FM tuner for home use.
**1956** First Performance Monitor in a high quality amplifier for home use.
**1956** First FM-AM tuner with TWO meters.
**1956** First complete graphic response curve indicator for bass and treble.
**1957** First Golden Cascode FM Tuner.
**1957** First MicroRay Tuning Indicator.
**1958** First Stereophonic Radio-Phonograph with Magnetic Stereo Cartridge.
**1959** First high-quality Stereo Remote Control System.
**1959** First complete Stereophonic FM-AM Receiver (FM-AM tuner, audio control, 40-watt amplifier).
**1959** First high-compliance plus high-efficiency free-piston speaker system.
**1960** First to use MicroRay for FM tuning and as a Recording Audio Level Indicator.
**1960** First complete stereo FM-AM receiver with 60-watt power amplifier and new 7591 output tubes.
**1960** Smithsonian Institution, Washington, D.C. accepts 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.
**1960** First FM tuner with six IF stages.

**1960** First FM tuner with five limiters.
**1960** First front panel antenna selector switch, 72-300 ohm, Local-Distant positions.
**1961** First Multiplex units with STEREO BEACON and automatic switching, mono to stereo.
**1961** First complete receivers with Multiplex.
**1961** First FM-Stereo-Multiplex tuners with STEREO BEAM.
**1961** First loudspeaker system with frameless woofer cone, eliminating all parasitic resonance.
**1961** First internal switching system to permit immediate tape playback with use of all controls and switches.
**1962** First simplified-operation Control-Amplifier, with infrequently used controls behind front-panel cover, yet immediately accessible.
**1962** First loudspeaker with eddy-current-damped voice coil.
**1962** First bass speaker with combined serrated-aluminum and fiber cone.
**1962** First FM Tuner Kit with separate d'Arsonval meter for tuning and separate cathode ray stereo broadcast indicator (STEREO BEAM).
**1962** First Stereophonic FM Tuner with TUNE-O-MATIC Motor Tuning.
**1962** First Supersonic Wireless Remote Control in a high fidelity component.
**1963** First to use 8417 tubes with unique cavity-anode design.
**1963** First power amplifier to use oscilloscope-type, frequency compensated input circuit.
**1963** First amplifier kit with STRATABALANCE, visual dynamic balancing system.

# THE FISHER X-202-B

## STEREOPHONIC

## Master Control Amplifier

ADVANCED ELECTRONIC DESIGN, unusual versatility, and functional simplicity are combined in the FISHER *X-202-B* to provide the ultimate in a *stereophonic* Master Control Amplifier. Incorporated on one compact chassis, engineered to Laboratory Standards, are a dual-channel Preamplifier-Equalizer, a dual-channel 80-watt Power Amplifier, and a self-contained Power Supply. Eighteen inputs and ten outputs will accommodate every type of cartridge, tape head, tape recorder and tuner on the market. Twenty controls on the front panel make possible the selection of any desired program source, for either monophonic or stereophonic operation, and the adjustment of every nuance of volume and tonal characteristics over the entire audio spectrum.

In addition, the *X-202-B* incorporates a new center channel output for the *direct* connection of a center speaker *without the need for an additional amplifier.* The new FISHER Tape Monitor System permits the use of the full range of audio controls during playback without changing cable connections. A special Stereo Dimension control, which blends the two signals, can be used to obtain any degree of stereo separation, a front panel earphone jack for use with either stereo or monaural earphones (a speaker switch turns off the Channel A and Channel B speakers) and Low Level volume sets are provided for added convenience. Provisions are also included for the easy connection of the FISHER RK-1 Remote Control, which permits the adjustment of volume and stereo balance from your favorite listening area.

The *X-202-B* represents more than two decades in the development of high fidelity instruments. Here is another example of the quality which has gained for THE FISHER a world-wide reputation.

## A NOTE ON STEREOPHONIC SOUND

STEREOPHONIC SOUND is a giant step forward in the history of high fidelity music reproduction. This unique dual-channel system offers a distinct advantage over monophonic (single-channel) systems by virtue of two important audio characteristics: the dimensions of *direction* and *depth.* These live sound qualities are for the most part missing in monophonic systems because recordings are made and reproduced over a single channel. This is somewhat analogous to listening to music with one ear. Stereophonic recording techniques, however, utilize two separate banks of microphones which are posi-

## TABLE OF CONTENTS



tioned at the left and right sections of the orchestra. In this arrangement, the microphones detect the musical sounds in much the same manner as the two ears of a listener. The sound picked up by each bank of microphones is then fed to independent channels and recorded on disks or tape, or transmitted over separate channels of a stereophonic broadcast.

To reproduce stereophonic realism in the home, two separate sound channels are required to achieve the stereophonic effect. The stereo sound output of a record player, tape recorder or tuner is fed to two separate amplifier channels, which in turn drive two separate speaker systems. Thus, instruments located on the left side of the orchestra are heard predominantly in the speakers to your left; instruments on the right side of the orchestra are heard predominantly in the speakers to your right; while instruments located in the center appear to be heard midway between the two speaker systems. If the sounds which should normally appear midway between the left and right speakers are lost in the middle of the stereo sound pattern, (usually caused by wide placement of the speakers), various methods can be used to fill in the middle.

With two speakers, the *X-202-B* provides a stereo Dimension control, which, when turned toward the MONO position will decrease the stereo separation between left and right speakers. This decreased separation between the speakers will appear to fill in tones to cover the middle.

A second method of solving this problem, is the addition of a center speaker, either independently driven by a center channel amplifier, or derived from the left and right channel amplifiers. The *X-202-B* provides Center Speaker terminal jacks on the rear panel, and a Center Speaker Level control on the front panel, to help establish the proper volume level of the center speaker. The Center Speaker Level control should be placed at a position that will set the center speaker at a volume 6 db below the volume of the left and right speakers. This should be done to prevent the center speaker from overpowering the others, and to give the center speaker the proper perspective in the stereo sound pattern.

The *X-202-B* also provides two separate output jacks for connection to a separate center channel amplifier. One jack (CENTER CHAN OUT) provides an output that is controlled by the *X-202-B*, and the other jack (RCRDR OUTPUT) provides an output that allows independent control of the signal by the additional amplifier.

If the center speaker method, of "filling in the hole of the stereo pattern", is chosen, it is recommended that the FISHER-WS-1 speaker be used and the other speakers be placed a bit further apart. This increased width will add greater spread to the stereo pattern. The result is a startling sense of *presence* realized only at a live orchestral performance.

## INSTALLING THE X-202-B

**WARNING:** The FISHER *X-202-B* must *not* be operated without first connecting speakers, or equivalent load resistors, to the Speaker Terminals in each channel. If you have not yet completed your stereophonic system, and are temporarily using only one channel of the *X-202-B*, use the Left Speaker terminals and be sure to connect an equivalent load resistor to the Speaker Terminals of the unused channel. See "Speaker Connections."

This unit may be installed in any convenient location that is *adequately* ventilated. The *X-202-B* should be mounted on a horizontal surface *only*, and if custom installed, at *least* five inches above and two inches at each side of the chassis should be free for air circulation. The *X-202-B* is designed for simple installation in your own custom cabinet. Directions and diagrams are provided in the last section of this booklet. Two FISHER cabinets, Model MC-2, in metal, and 10-U, in wood, are available from your FISHER dealer. Either will convert the *X-202-B* into an attractive part of your room decor. Temporarily, place this unit in its approximate final location to permit an estimate of the necessary cable lengths to the associated components.

Note: Stereophonic sound utilizes the left speaker system, designated Channel A, for music originating on the left side of the orchestra; while the right speaker system, designated Channel B, is used for music originating in the right section of the orchestra. To recreate the original orchestral arrangement in your room, connect the speaker on your left (as viewed from the listening area) to the Channel A amplifier section, and connect the speaker on your right to the Channel B amplifier section.

To obtain optimum stereophonic performance from your FISHER equipment, use two speaker systems as nearly alike as possible. Certain precautions should be observed in determining their final location.

Where possible, speakers should be set against a flat wall and separated by a *minimum* of five feet to achieve a satisfactory stereophonic effect. As a rule of thumb, the best listening area will be at a distance about 1½ times as great as the separation between the speakers. For example: if the speakers are six feet apart, listening will be best in an area about nine feet from, and opposite, the two systems. Because of varying acoustical conditions, however, the speakers may have to be re-positioned to achieve the best stereophonic results that circumstances permit.

If you place wall-type speakers in the room corners, undesirable effects may be introduced. Try placing them, instead, on the same wall, a short distance from the corners.

If you own two corner-type speaker systems, experiment by leaving one in a corner and placing the other against a flat wall. Then compare this arrangement with the original one.

In a long, narrow room, placing the speakers on the long wall may bring better results than placing them on the short one.

### Speaker Connections

For distances up to 50 feet, ordinary lamp cord may be used, but for longer distances heavier wiring should be used to prevent losses caused by the resistance of the wires. *Be sure that none of the wires*

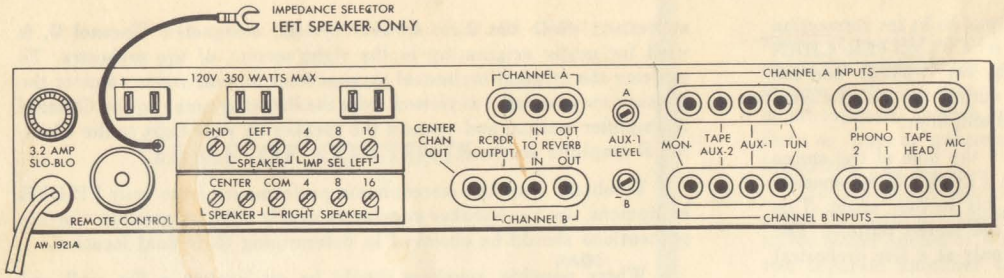



**FIGURE 1: Rear panel of X-202-B**



*are shorted together or allowed to touch the GND lug on the Left Speaker terminal strip.*

**ONE SPEAKER:** If you are temporarily using only one speaker, it should be connected to the two lugs at the upper terminal strip, marked LEFT SPKR. The short wire with fork type lug protruding from the chassis directly above the terminal strip should be connected to the 4, 8, or 16-ohm terminal lug marked IMP SEL LEFT, depending on the impedance of your loudspeaker. Then connect an 8 to 10-ohm resistor rated at 10 watts to the two lugs on the (lower) RIGHT SPEAKER terminal strip marked COM and 4. The BALANCE control on the front panel should be turned fully counter-clockwise (to MAX-L).

**TWO SPEAKERS:** Connect the left speaker (as viewed from the listening area) to the terminal lugs marked LEFT SPKR. Then connect the short wire protruding from the chassis directly above the terminal strip to the 4, 8, or 16-ohm terminal lug marked IMP SEL LEFT, depending on the impedance of your loudspeaker. The speaker system on your right should be connected between the COM and the 4, 8, or 16-ohm lug on the RIGHT SPEAKER terminal lug, depending on the impedance of your loudspeaker.

**THREE SPEAKERS:** After connecting the left and right speakers as just described, connect the Center Channel speaker to the CENTER SPEAKER lugs (on the lower terminal strip). A Center Channel speaker is particularly useful in large rooms where the left and right speakers are placed far apart, resulting in a "hole in the middle" of the stereo sound pattern. In order to vary the volume of the center speaker use the CENTER SPEAKER control. If you have a third power amplifier to use in conjunction with a center speaker, connect the amplifier input to the CENTER CHANNEL OUT jack, on the rear panel of the *X-202-B*.

The volume of the center channel amplifier is controlled by the MASTER VOLUME control. The CENTER CHANNEL OUT jack provides a monophonic blend of the two stereo channels, and may, therefore, be located in another room (up to 100 feet of cable may be connected to this jack).

## Auxiliary AC Receptacles

The three auxiliary receptacles on the rear panel may be used as power outlets for your associated components. The combined power consumption of these components should not exceed 350 watts. Power

to these receptacles is supplied only when power to the *X-202-B* is turned on.

## Record Players and Changers

**MAGNETIC STEREO CARTRIDGE:** Connect the A and B output cables from the cartridge to the A and B PHONO 1 input jacks. (Use the PHONO 2 input jacks for a second record player.)

**MAGNETIC MONOPHONIC CARTRIDGE:** Connect the output cable from the cartridge to the A *or* B PHONO 1 input jack.

## Tape Recorders

A standard stereophonic or monophonic Tape Recorder (equipped with its own preamplifier) may be used with the *X-202-B* in two ways. First, it can be used to record the output of either a Tuner or a Record Player, or another Tape Recorder or Tape Head being played through the *X-202-B*. Secondly, it can play through the *X-202-B* previously recorded program material. Permanent connections between the Recorder and the *X-202-B* can be made to carry out these functions.

*NOTE:* If you use a tape recorder in conjunction with the *X-202-B*, do not connect any external component to the TAPE AUX-2 jacks since the MON and TAPE AUX-2 jacks are electrically connected.

**STEREOPHONIC RECORDER:**

1—Connect the Channel A output from the recorder to the Channel A MON input jack on the rear panel of the *X-202-B*.

2—Connect the Channel B output from the tape recorder to the Channel B MON input jack.

3—Connect the Channel A RCRDR OUTPUT jack on the *X-202-B* to the recorder Channel A input jack.

4—Connect the Channel B RCRDR OUTPUT jack to the Channel B input jack on the tape recorder.

**MONOPHONIC RECORDER:** Make connections to the Channel A jacks only. To make a monophonic recording of a stereo program source make sure that the Mode Selector switch is in the MONO PHONO position. To play back your tapes through both speaker systems, turn the Input Selector to TAPE AUX-2 and the Mode Selector switch to the A position.

## Tape Decks

A Tape deck is the tape transport mechanism minus the preamplifier and audio controls. To provide playback for recorded tapes, it must be connected to an amplifier. These facilities are furnished by the *X-202-B*.

If you have a *stereophonic* Tape Deck, connect A and B output cables from the Tape Deck to the A and B TAPE HEAD input jacks on the *X-202-B*.

If you have a *monophonic* Tape Deck, connect the single output cable from the Tape Deck to either A *or* B TAPE HEAD input jack.

## Tuners

The *X-202-B* is equipped to accommodate various combinations of tuner outputs. These include monophonic FM, AM, or FM-AM; stereophonic FM-AM, and the new stereophonic FM-Multiplex broadcasts.

If you have a monophonic FM or AM Tuner, or both, connect the output cable from the FM Tuner to Channel A TUN input jack, and the cable from the AM Tuner to Channel B TUN input jack.

If you have an FM-AM *monophonic* Tuner, connect the output cable to either Channel A *or* Channel B TUN input jack.

If you have an FM-AM *stereophonic* Tuner, connect the cable from the FM section to Channel A TUN input jack, and the cable from the AM section to the Channel B TUN input jack.

*NOTE:* The FM portion of an FM-AM stereophonic broadcast is heard on Channel A (left speaker), while the AM portion of the

broadcast is heard on Channel B (right speaker). If you have an FM-AM *monophonic* Tuner, you must connect an additional AM or FM Tuner to the *X-202-B* to listen to FM-AM stereo broadcasts.

To listen to FM-Multiplex stereophonic broadcasts, your FM Tuner must be equipped with an adaptor, such as the FISHER MPX-100. Connect your FM Tuner with the Multiplex Adaptor to the *X-202-B* as described in the operating instructions furnished with the Adaptor and Tuner.

### Spacexpander

Special jacks are provided on the rear panel for the connection of the FISHER *Dynamic Spacexpander*, Model K-10. Before installing the *Spacexpander*, remove the two jumper plugs and store them in a safe place for possible future use. *If the Spacexpander is not connected, the jumper plugs must be inserted or the X-202-B will not operate.* The jacks on the *X-202-B* are marked to correspond to the markings on the *Spacexpander*. The Channels A and B TO REVERB OUT jacks on the *X-202-B* should be connected to the corresponding output jacks on the *Spacexpander*, and the jacks marked TO REVERB IN should be connected to the *Spacexpander* inputs. Be sure that you do not reverse the channels while making these connections.



### Microphone

A high impedance dynamic microphone (or a pair for stereo) may be connected to one of the MIC jacks on the rear panel. Crystal microphones should be connected to one of the AUX input jacks.

### Other Program Sources

If you wish to connect a short wave Tuner, or the audio output from your TV set, to the *X-202-B*, use the Channel A or B AUX-1 input jacks. Consult with your serviceman if you are uncertain about making connections from your TV set. You can connect any other *high level* program sources to these AUX 1 input jacks.

### Remote Control

A nine-pin jack on the rear panel, to the left of the Speaker Terminal strip, accommodates the FISHER RK-1 Remote Control. This device makes possible the adjustment of sound on both channels from your favorite listening area for achieving perfect stereophonic balance. Do not remove the dummy plug from this jack, if you are not using the RK-1; otherwise, the *X-202-B* will be inoperative. See the instructions accompanying the unit for installation and operation instructions.

### System Grounding

Audible hum caused by cable connections can be eliminated by connecting the chassis of other components and the motor ground of the record player to the GND lug on the Left Speaker terminal strip. *Make certain that these ground wires do not contact any of the speaker lugs or serious damage to the equipment may result.*

## HOW TO OPERATE THE X-202-B

AFTER YOU HAVE MADE all required connections, plug the power cable into a wall outlet supplying 105 to 120 volts *AC only*, at 50 to 60 cycles. (Where line voltage is lower or higher, a step-up or step-down transformer will be necessary. Consult your serviceman.) Total power consumption of this unit, *not including associated components*, is 220 watts.

With the exception of the Level Sets on the rear panel, all operating controls are on the front panel as illustrated on page 7. An explanation of the function of each control is provided in this section. Like any fine electronic instrument, the *X-202-B* will operate at its full potential only if it is used properly. We therefore urge you to read the following information carefully.

*NOTE:* A simplified At-A-Glance Operating Guide is furnished at the conclusion of this section. This Guide will enable you to select any program source you wish to hear and set all significant controls in a matter of seconds.

to these receptacles is supplied only when power to the *X-202-B* is turned on.

## Record Players and Changers

**MAGNETIC STEREO CARTRIDGE:** Connect the A and B output cables from the cartridge to the A and B PHONO 1 input jacks. (Use the PHONO 2 input jacks for a second record player.)

**MAGNETIC MONOPHONIC CARTRIDGE:** Connect the output cable from the cartridge to the A *or* B PHONO 1 input jack.

## Tape Recorders

A standard stereophonic or monophonic Tape Recorder (equipped with its own preamplifier) may be used with the *X-202-B* in two ways. First, it can be used to record the output of either a Tuner or a Record Player, or another Tape Recorder or Tape Head being played through the *X-202-B*. Secondly, it can play through the *X-202-B* previously recorded program material. Permanent connections between the Recorder and the *X-202-B* can be made to carry out these functions.

*NOTE:* If you use a tape recorder in conjunction with the *X-202-B*, do not connect any external component to the TAPE AUX-2 jacks since the MON and TAPE AUX-2 jacks are electrically connected.

**STEREOPHONIC RECORDER:**

1—Connect the Channel A output from the recorder to the Channel A MON input jack on the rear panel of the *X-202-B*.

2—Connect the Channel B output from the tape recorder to the Channel B MON input jack.

3—Connect the Channel A RCRDR OUTPUT jack on the *X-202-B* to the recorder Channel A input jack.

4—Connect the Channel B RCRDR OUTPUT jack to the Channel B input jack on the tape recorder.

**MONOPHONIC RECORDER:** Make connections to the Channel A jacks only. To make a monophonic recording of a stereo program source make sure that the Mode Selector switch is in the MONO PHONO position. To play back your tapes through both speaker systems, turn the Input Selector to TAPE AUX-2 and the Mode Selector switch to the A position.

## Tape Decks

A Tape deck is the tape transport mechanism minus the preamplifier and audio controls. To provide playback for recorded tapes, it must be connected to an amplifier. These facilities are furnished by the *X-202-B*.

If you have a *stereophonic* Tape Deck, connect A and B output cables from the Tape Deck to the A and B TAPE HEAD input jacks on the *X-202-B*.

If you have a *monophonic* Tape Deck, connect the single output cable from the Tape Deck to either A *or* B TAPE HEAD input jack.

## Tuners

The *X-202-B* is equipped to accommodate various combinations of tuner outputs. These include monophonic FM, AM, or FM-AM; stereophonic FM-AM, and the new stereophonic FM-Multiplex broadcasts.

If you have a monophonic FM or AM Tuner, or both, connect the output cable from the FM Tuner to Channel A TUN input jack, and the cable from the AM Tuner to Channel B TUN input jack.

If you have an FM-AM *monophonic* Tuner, connect the output cable to either Channel A *or* Channel B TUN input jack.

If you have an FM-AM *stereophonic* Tuner, connect the cable from the FM section to Channel A TUN input jack, and the cable from the AM section to the Channel B TUN input jack.

*NOTE:* The FM portion of an FM-AM stereophonic broadcast is heard on Channel A (left speaker), while the AM portion of the

broadcast is heard on Channel B (right speaker). If you have an FM-AM *monophonic* Tuner, you must connect an additional AM or FM Tuner to the *X-202-B* to listen to FM-AM stereo broadcasts.

To listen to FM-Multiplex stereophonic broadcasts, your FM Tuner must be equipped with an adaptor, such as the FISHER MPX-100. Connect your FM Tuner with the Multiplex Adaptor to the *X-202-B* as described in the operating instructions furnished with the Adaptor and Tuner.

### Spacexpander

Special jacks are provided on the rear panel for the connection of the FISHER *Dynamic Spacexpander*, Model K-10. Before installing the *Spacexpander*, remove the two jumper plugs and store them in a safe place for possible future use. *If the Spacexpander is not connected, the jumper plugs must be inserted or the X-202-B will not operate.* The jacks on the *X-202-B* are marked to correspond to the markings on the *Spacexpander*. The Channels A and B TO REVERB OUT jacks on the *X-202-B* should be connected to the corresponding output jacks on the *Spacexpander*, and the jacks marked TO REVERB IN should be connected to the *Spacexpander* inputs. Be sure that you do not reverse the channels while making these connections.



### Microphone

A high impedance dynamic microphone (or a pair for stereo) may be connected to one of the MIC jacks on the rear panel. Crystal microphones should be connected to one of the AUX input jacks.

### Other Program Sources

If you wish to connect a short wave Tuner, or the audio output from your TV set, to the *X-202-B*, use the Channel A or B AUX-1 input jacks. Consult with your serviceman if you are uncertain about making connections from your TV set. You can connect any other *high level* program sources to these AUX 1 input jacks.

### Remote Control

A nine-pin jack on the rear panel, to the left of the Speaker Terminal strip, accommodates the FISHER RK-1 Remote Control. This device makes possible the adjustment of sound on both channels from your favorite listening area for achieving perfect stereophonic balance. Do not remove the dummy plug from this jack, if you are not using the RK-1; otherwise, the *X-202-B* will be inoperative. See the instructions accompanying the unit for installation and operation instructions.

### System Grounding

Audible hum caused by cable connections can be eliminated by connecting the chassis of other components and the motor ground of the record player to the GND lug on the Left Speaker terminal strip. *Make certain that these ground wires do not contact any of the speaker lugs or serious damage to the equipment may result.*

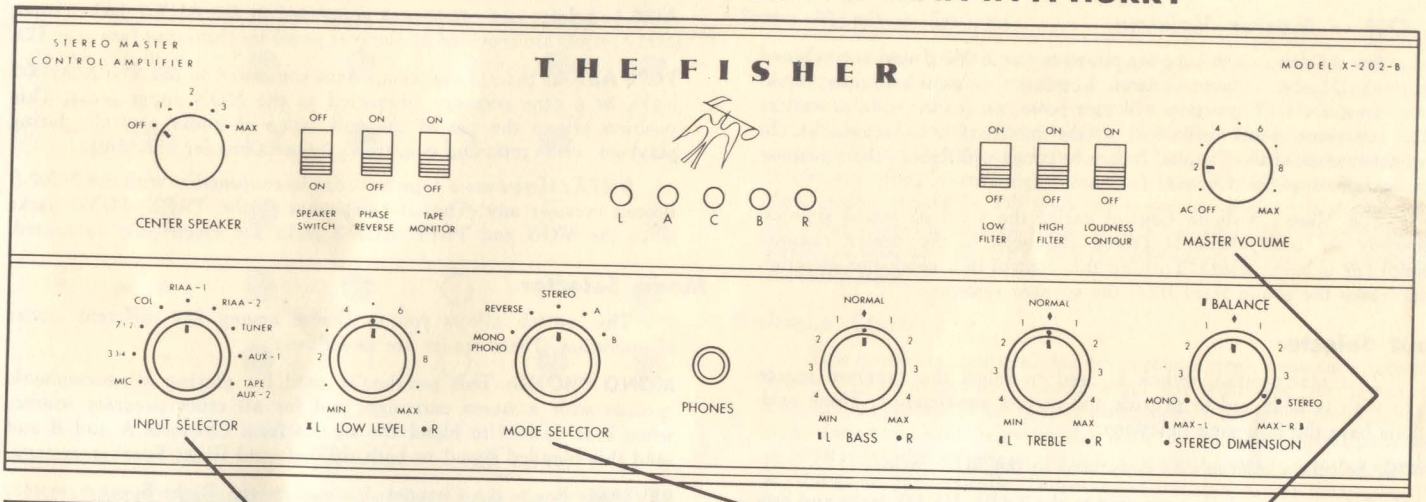
## HOW TO OPERATE THE X-202-B

AFTER YOU HAVE MADE all required connections, plug the power cable into a wall outlet supplying 105 to 120 volts *AC only*, at 50 to 60 cycles. (Where line voltage is lower or higher, a step-up or step-down transformer will be necessary. Consult your serviceman.) Total power consumption of this unit, *not including associated components*, is 220 watts.

With the exception of the Level Sets on the rear panel, all operating controls are on the front panel as illustrated on page 7. An explanation of the function of each control is provided in this section. Like any fine electronic instrument, the *X-202-B* will operate at its full potential only if it is used properly. We therefore urge you to read the following information carefully.

*NOTE:* A simplified At-A-Glance Operating Guide is furnished at the conclusion of this section. This Guide will enable you to select any program source you wish to hear and set all significant controls in a matter of seconds.

# A SHORT OPERATING GUIDE FOR THE 'MAN IN A HURRY'




## STEP 2

Set ***INPUT SELECTOR*** to the program source you wish to hear.

**RIAA-1 or RIAA-2** to listen to a record.

**TUNER** to listen to a radio broadcast.

**AUX-1** to listen to any program source connected to the AUX-1 jacks.

**TAPE AUX-2** to listen to a tape recorder.

## STEP 3

Set ***MODE SELECTOR*** to type of operation required.

**STEREO** to listen to *all* stereo program material (phono, radio or tape).

**A** for FM broadcast or any program source connected to Channel A.

**B** for AM broadcast or any program source connected to Channel B.

## STEP 1

Turn on power by turning ***MASTER VOLUME*** control slightly clockwise until it clicks. Adjust later for desired volume.

**NOTE:** *Set all other switches and controls in the position shown.*

## AC Off — Master Volume

The AC-Off switch supplies power to the *X-202-B* and is combined with the Master Volume Control. Turning this switch slightly clockwise from the OFF position will turn power on for the unit, as well as for any components connected to the auxiliary AC receptacles. In addition some of the Channel Indicator lamps will light; (their purpose is explained under "Channel Indicator Lights.")

The Master Volume Control varies the level of sound simultaneously on both channels (three channels, if the center channel amplifier is being used). Turning this control in a clockwise direction increases the sound level from the speaker systems.

## Input Selector



This nine-position switch is used to select the program source you wish to hear and to provide the correct equalization. These positions have the following functions:

**MIC:** Selects a microphone connected to the MIC jacks.

**3¾:** Selects a tape deck connected to the TAPE HEAD jacks and provides the correct equalization for tapes played at a speed of 3¾ inches per second.

**7½:** Selects a tape deck connected to the TAPE HEAD jacks and provides correct equalization for tapes played at a speed of 7½ ips.

**COL:** This position provides equalization for Columbia and similar records released prior to 1955 on a record player connected to the PHONO 1 input jacks.

**RIAA-1:** Provides correct equalization for all records released since 1954 on a record player connected to the PHONO 1 input jacks.

**RIAA-2:** Provides identical equalization for a record player connected to the PHONO 2 jacks.

**TUNER:** Selects a tuner connected to the TUN jacks.

**AUX-1:** Selects any component connected to the AUX-1 jacks. Input level controls are provided on the rear panel for this input (see page 12).

**TAPE AUX-2:** Selects any component connected to the TAPE AUX-2 jacks, *or* a tape recorder connected to the MON input jacks. This position allows the use of the full range of audio controls during playback while retaining monitoring connections for recording.

*NOTE:* If you use a tape recorder in conjunction with the *X-202-B* do not connect any external component to the TAPE AUX-2 jacks since the MON and TAPE AUX-2 jacks are electrically connected.

## Mode Selector

This switch allows you to choose among five different modes of operation. These modes are as follows:

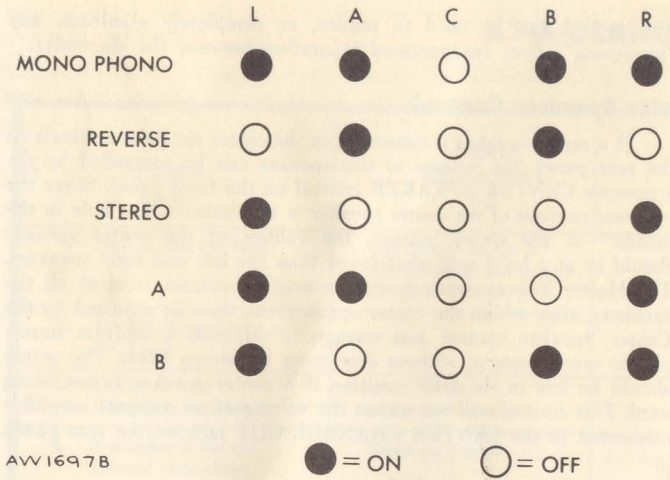
**MONO PHONO:** This position is used for playing all monophonic records with a stereo cartridge, and for all other program sources when it is desired to blend the signals from Channels A and B and send this blended signal to both the Left and Right Speaker systems.

**REVERSE:** Sends the Channel A signal to the Right Speaker system and the Channel B signal to the Left Speaker system. Since normal operation is just the opposite of this, the REVERSE position should only be used if the channels are inadvertently crossed at the source during a particular performance.

**STEREO:** This position is normally used for all stereo programs, whether on records, tape or radio. The Channel A signal is directed to the Left Speaker system and the Channel B signal to the Right Speaker system.

**A:** By selecting this position, you can listen to any monophonic program connected to a Channel A input jack through both speaker systems.

**B:** Any monophonic program connected to a Channel B input jack may be heard through both speaker systems by selecting this position.




**NOTE:** "C" BRIGHTENS WHEN CENTER SPEAKER IS USED

**TABLE 1: Channel indicator lights**

## Channel Indicator Lights

The five colored jewels provide a visual indication of the position at which the Mode Selector is set and will light in different sequences depending upon the type of circuit operation. The L and R jewels represent the left and right speakers; while the A and B jewels represent Channel A and B inputs. The C jewel will brighten when the Center Speaker is used. Table I is a guide to the different light sequences. For example: for B the L, B and R jewels will light. This means that the signals at the Channel B input will appear at the right and left speakers.

## Tape Monitor Switch

This switch is used to monitor tapes *while recording* on machines equipped with separate recording and playback heads. If you are using such a recorder, you can listen to the tape as it is being recorded by sliding the Tape Monitor switch to ON. With the switch in the OFF position, you will hear the input signal and will be able to compare it with the tape. Operation of this switch does not affect the recording. This switch should be ON *only when recording* since it disconnects all other program sources when in this position. The Tape Monitor switch should be left OFF during ordinary playback of previously recorded tapes.

## Balance Control

This control is used to obtain equal sound levels from each speaker system — an important consideration for achieving the optimum stereophonic effect. (This is also advantageous for monophonic operation where two channels are used.) With the Balance Control pointing to NORMAL, the volume at the left and right speaker systems should be the same, theoretically. However, an imbalance may occur due to room acoustics, record characteristics, differences in stereo cartridge outputs or speaker efficiencies etc. This imbalance can be corrected with the Balance Control. Simply turn the knob toward MAX-A or MAX-B to increase the volume level at the left or right speaker system, as required. It should be pointed out that this is not a volume control; for, as the level of sound is increased on one speaker system, it is decreased on the other, maintaining the same overall sound output. This control is also used to determine the correct polarity of stereo earphones connected to the PHONES jack on the front panel.

## Phase Reverse Switch

The Phase Reverse switch is used, initially, to determine if the two speaker systems are properly phased; that is, whether the speaker cones of both speaker systems are moving in the same direction at the same time. In addition, this switch provides a means of correcting for

improperly-phased program sources. These are necessary steps for deriving the best performance from either stereophonic or monophonic operation.

**SPEAKER PHASING:** An easy way to determine whether speakers are in phase is to play some *monophonic* program source, containing predominantly low frequency material, with the Phase Reverse switch in the OFF position. Then move the switch to ON. The signal in Channel B will be reversed 180 degrees. If there is a noticeable *decrease* in volume, your speakers are in phase. If there is an *increase* in volume, your speakers are out of phase. In this case, reverse the leads of *either* speaker system. (Return the switch to OFF.) Your speaker systems will then be permanently in phase.



**PROGRAM PHASING:** Once the loudspeaker systems have been phased, the Phase Reverse switch is returned to the OFF position. From then on, it can be used to correct for improperly phased *stereophonic* program material. This condition will occur infrequently and is less easily recognized. If it is known, or suspected, that a program source—whether a record, tape, or broadcast—is out of phase, set the Phase Reverse switch to ON. If there is a noticeable improvement in the bass tones, or if the center of the stereophonic sound pattern is "filled," you can assume that the program source is out of phase. Practice and experience will enable you to detect out-of-phase program material readily. As stereophonic recording techniques are improved and standardized, the problem of phasing will diminish considerably. Always return the Phase Reverse switch to the OFF position when not required.

## Stereo Dimension Control

With this control, you can combine, or blend, the signals from both channels to any desired degree. At the STEREO position, complete separation exists between both channels. As you turn this control toward MONO, the signals are progressively combined to fuse the total sound pattern. When listening to a stereophonic program source, this control can be used to reduce, or completely eliminate, any "ping-pong" effect (exaggerated separation between the channels).

## Center Speaker Control

If a center speaker is connected to the center speaker terminals on the rear panel, the volume of this speaker can be controlled by the 5 position CENTER SPEAKER control on the front panel. Since the ultimate purpose of the center speaker is to eliminate the "hole in the middle" of the stereo pattern, the volume of the center speaker should be at a level somewhat lower than the left and right speakers. The Master Volume control sets the original volume level of all the speakers, after which the center speaker can then be adjusted by the Center Speaker control just enough to establish a uniform stereophonic sound pattern, without destroying the stereo effect. The switch should be left in the OFF position if a center speaker is not being used. *This control will not* adjust the volume of an external amplifier connected to the CENTER CHANNEL OUT jack on the rear panel.

## Loudness Contour Switch

As the over-all volume of sound is reduced, our hearing efficiency drops off more rapidly at the extreme ends of the tonal spectrum (deep bass and upper treble—as established by the Fletcher-Munson curves). The Loudness switch automatically compensates for this natural relative hearing loss.

If you wish to listen at low volume, move this switch to ON. Compensation will be introduced to raise the highs and lows to a level with your middle-frequency hearing sensitivity. *Note:* At high volume levels, leave this control in OFF position; otherwise, unrealistic sound will result.

## Bass and Treble Controls

The Bass Control regulates the intensity of the low frequency, or bass tones; while the Treble Control regulates the intensity of the

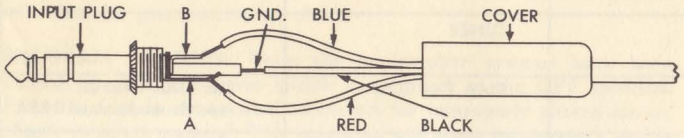
# AT-A-GLANCE OPERATING GUIDE

| To Listen To A: | Make Connections To: | Turn Mode Selector To: | Turn Input Selector To: | Remarks |
|---|---|---|---|---|
| 1. FM-AM Stereo Tuner | FM Output to Ch A TUNER jack; AM output to Ch B TUNER jack | STEREO for stereo broadcast; A for FM; B for AM | TUNER | |
| 2. FM-AM Mono Tuner or FM Tuner | | A | TUNER | |
| 3. Stereo Record (Magnetic cartridge) | Ch A & Ch B PHONO 1 jacks | STEREO | RIAA 1 or COL | Use RIAA 1 for all records made since 1954 |
| 4. Monophonic Record (Stereo cartridge) | Same as 3 or 4 | MONO PHONO | RIAA 1 or COL | |
| 5. Stereo Tape Recorder (3-head) | RCRDR Outputs; TAPE MON inputs | STEREO | TAPE AUX-2 (except when recording) | Tape Monitor ON for monitoring while recording |
| 6. Stereo Tape Recorder (2-head) | RCRDR Outputs; AUX-2 inputs | STEREO | TAPE AUX-2 | |
| 7. Monophonic Tape Recorder (3-head) | Ch A RCRDR output; Ch A TAPE MON input | A | TAPE AUX-2 (except when recording) | Tape Monitor ON for monitoring while recording; Stereo Dimension control to MONO |
| 8. Monophonic Tape Recorder (2-head) | Ch A RCRDR output; Ch A AUX-2 input | A | TAPE AUX-2 | |

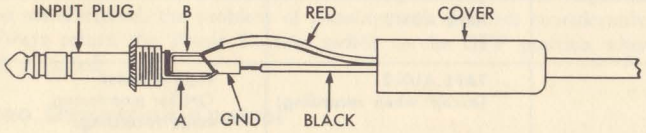
high frequency, or treble tones. Each set of controls has dual knobs mounted one behind the other—the small knob with the black bar for Channel A, and the outer knob with the dot for Channel B. Turning either knob will turn the other, for they are "friction-fitted." However, if you wish to adjust the level for each channel separately hold one knob while turning the other.

To increase the Bass or Treble intensity, turn the knobs in a clockwise direction toward MAX.






FOR STEREO, WIRE: RED TO A, BLUE TO B, BLACK TO GND.
AW # 1982




FOR MONO, WIRE: RED TO A AND B, BLACK TO GND.
AW # 1983

**FIGURE 2. Wire Connections for Stereo or Mono Earphones**

## Earphones Jack

A special earphones jack, marked PHONES, on the front panel is provided so that either Stereo or Mono earphones can be connected. A matching plug is provided in the accessories bag for connection to stereo or mono earphones, with different types of connectors. The wiring of the plug for stereo or mono earphones is shown in Fig. 2. In order to check that the earphones are operating properly, turn the BALANCE control fully clockwise to hear only the B channel output in the *right* earpiece, and fully counter-clockwise to hear only the A channel in the *left* earpiece. If the proper channel is not present at each earpiece, reverse the headset. *REMOVE* earphones from jack when not in use. Please note that the Phase Reverse switch should be left OFF when using earphones.

## Speaker Switch

In order to turn off the left and right speakers (when listening to earphones or the center channel speaker), place the SPEAKER SWITCH in the OFF posiition. The CENTER SPEAKER control will turn off the center speaker *only*.

## High Filter Switch

Use this switch in the ON position to eliminate record surface noise, distant station interference, and other undesirable high frequency noises originating in your record player or tape recorder. Return this switch to OFF at all other times.

## Low Filter Switch

Move this switch to ON position to eliminate turntable rumble or other low-frequency interference. Leave this switch in OFF position at all other times.

## Level Sets

Two pairs of input level sets are provided, the Low Level sets on the front panel, and the AUX-1 level sets on the rear panel. The Low Level sets control the PHONO 1, PHONO 2, TAPE HEAD and MIC inputs. The Low Level sets are indexed so that you can make a note

of the settings for each pair of inputs. The level sets are used in the following manner:

**LOW LEVEL:** Turn both controls fully counter-clockwise; play a monophonic record and turn the Master Volume control fully clockwise. Then turn the Low Level sets slowly clockwise until the volume level is as loud as you will ever want to hear. Turn the Master Volume control counter-clockwise until normal listening volume is reached.

**AUX-1:** The same procedure is used to adjust the AUX-1 input levels for a component connected to the AUX-1 jacks.

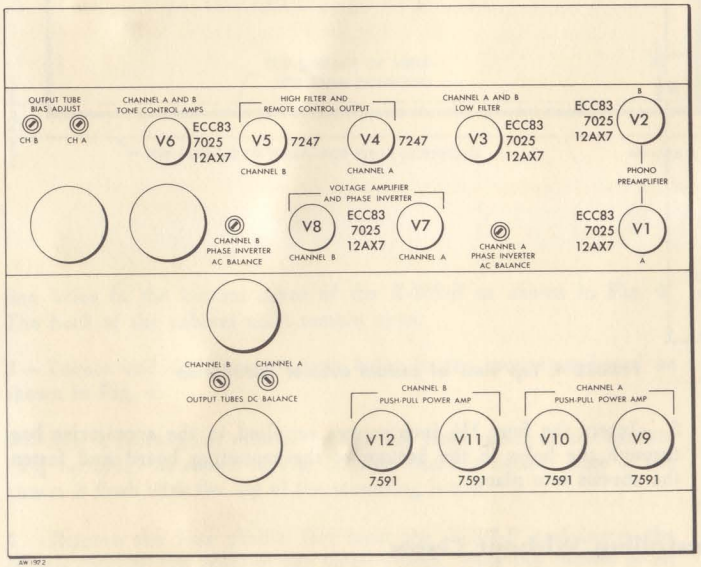



**FIGURE 3. Tube layout for X-202-B**

## CIRCUIT ADJUSTMENT CONTROLS

Six Adjustment Controls, three for each channel, are located at the top of the chassis. Their purpose and method of adjustment are explained in the Service Manual for the *X-202-B*. Do not attempt to reset these controls if you are not equipped with the proper test equipment.

## CUSTOM INSTALLATION

Two special custom cabinets, designed to accommodate the *X-202-B*, are available from your FISHER dealer. These are the Model MC-2 metal cabinet, and Model 10-U wood cabinet. Both are attractively designed to enhance room decor. The *X-202-B* may also be mounted in your own custom cabinet. Directions and illustrations are provided in this section.

Because adequate ventilation is an *absolute essential* for trouble-free operation, never install the *X-202-B* in a totally enclosed space, or too close to other heat-producing equipment. Also, do not install the *X-202-B* in a vertical position. If the *X-202-B* is mounted in a custom installation, the back of the equipment cabinet should be left open and a space of 5 inches above and 2 inches to each side of the *X-202-B* should be provided in the enclosure for the amplifier.

The *X-202-B* may be installed in two ways: with cleats, to raise it above the shelf of the cabinet to provide ventilation; or, without cleats, in which case cutouts must be made in the cabinet shelf. The two types of installation follow.

### Installing With Cleats

1 — Obtain a strip of wood ¾ inches square and 25 inches long. Cut this strip in half to form two 12½ inch cleats.

2 — Fasten the two cleats to the top of the mounting board with wood screws, in the positions shown in Fig. 4. Then locate and drill four ¼-inch holes through the mounting board and cleats as indicated.

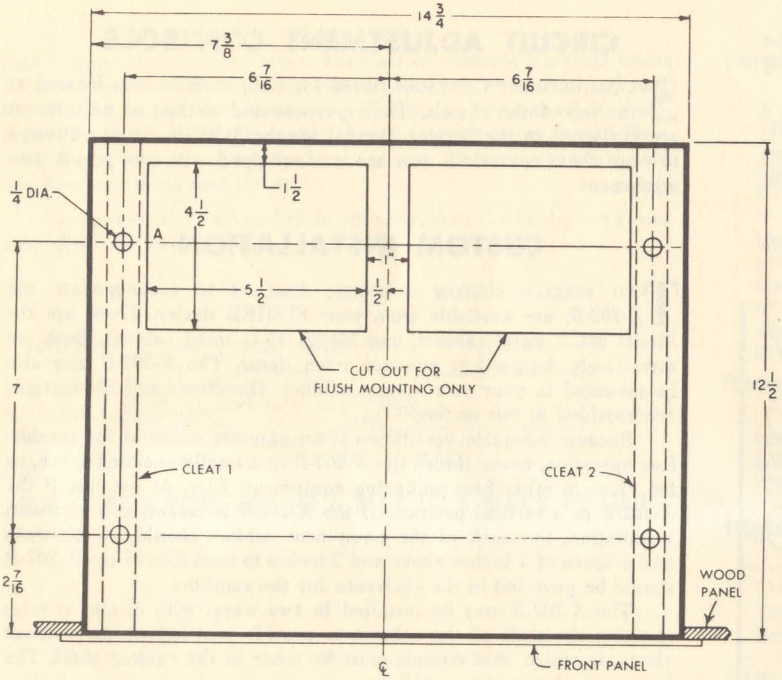



**FIGURE 4. Top view of custom cabinet installation**

3 — Saw a cutout through the front panel of your cabinet (4½ by 14¾) as shown in Fig. 5. The bottom edge of the cutout should be on a level with the top of the two cleats.

4 — Remove the four plastic feet from the *X-202-B* and insert the chassis through the *front* of the panel cutout. Slide the chassis into the cabinet until the back of the control panel is tight against the panel of the cabinet.

5 — Insert the four 1½ inch screws supplied in the accessories bag through the holes in the bottom of the mounting board and fasten the chassis into place.

## Installing Without Cleats

1 — Cutouts must be made in the mounting board beneath the ventila-

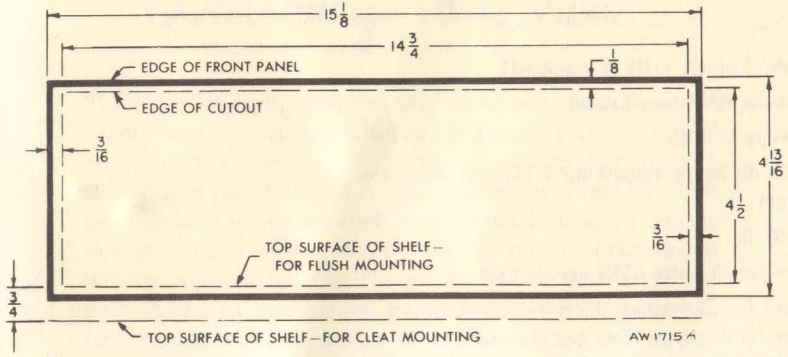



**FIGURE 5. Front panel cutout for mounting**



tion holes in the bottom cover of the *X-202-B* as shown in Fig. 4. The back of the cabinet must remain open.

2 — Locate and drill four ¼-inch holes in the mounting board as shown in Fig. 4.

3 — Saw a rectangular cutout through the front panel of the cabinet (4½ by 14¾) as shown in Fig. 5. Note that the bottom edge of the cutout is flush with the top of the mounting board.

4 — Remove the four plastic feet from the *X-202-B* and insert the chassis through the *front* of the panel cutout. Slide the chassis in all the way until the back of the front panel fits tightly against the panel of the cabinet.

5 — Insert the four 1-inch screws supplied in the accessories bag through the holes in the bottom of the mounting board and fasten the chassis into place.

## At Your Service

It is our desire that THE FISHER operates to your complete satisfaction. We solicit your correspondence on any special problems that may arise. After you have had an opportunity to familiarize yourself with THE FISHER, we would appreciate hearing from you concerning how it is meeting your requirements.

## Your Fisher Dealer

Be sure to consult your FISHER dealer promptly if any defect is indicated. He stands ready to assist you at any time.

# TECHNICAL SPECIFICATIONS

| | |
|---|---|
| **Music Power Output:** | 80 watts both channels (IHFM standard) |
| **Harmonic Distortion:** | 0.5% at 35 watts RMS per channel |
| **Frequency Response:** | 20 to 20,000 cps ± 1 db |
| **Hum and Noise:** | More than 80 db below rated output (450 mv reference at AUX input) |
| **Channel Separation:** | Better than 50 db |
| **Low Level Sensitivity:** | MIC: 1.5 mv for 35 watts RMS per channel<br>RIAA: 3.5 mv for 35 watts RMS per channel<br>COL: 3.0 mv for 35 watts RMS per channel<br>TAPE HEAD (3¾): 1.8 mv for 35 watts RMS per channel<br>TAPE HEAD (7½): 2.1 mv for 35 watts RMS per channel |
| **High Level Sensitivity:** | 280 mv for 35 watts RMS per channel |
| **Low Filter Slope:** | 12 db/octave below 50 cps |
| **High Filter Slope:** | 16 db/octave above 5 kc |
| **Subsonic Filter:** | 16 db/octave roll off below 20 cps |
| **Bass Controls:** | 16 db boost and 17 db cut at 50 cps |
| **Treble Controls:** | 16 db boost and 17 db cut at 10 kc |
| **Power Requirements:** | 105 to 120 volts AC, 50 to 60 cycles |
| **Power Consumption:** | 220 watts |

# Warranty To Owner

The FISHER equipment you purchased was carefully tested before leaving our laboratories. If properly installed and operated in accordance with the instructions furnished, it should give you the finest results of which it is capable. This equipment is unconditionally guaranteed against all defects in material and workmanship. Any defects in workmanship will be adjusted without charge for ninety days from the date of sale to the original purchaser. Defective parts will be replaced without charge for one year from the date of sale to the original purchaser. In addition, there will be no charge for replacement labor on all factory-wired units and kit subassemblies, during the first 90 days. Parts replacement and labor, under the above warranty, will be supplied by the dealer from whom the purchase was made. To protect your warranty, and to register your ownership, please be sure to mail this card within 10 days from date of purchase.

**IMPORTANT NOTE:** The guarantee is void unless the equipment is installed with proper ventilation, in accordance with the Operating Instruction Manual, or unless the equipment is used with a genuine FISHER component cabinet.

**FOR WARRANTY SERVICE, CONSULT YOUR DEALER**

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I heard of the FISHER through ☐ Friend ☐ Dealer ☐ Advertising

If purchased because of advertising, please give name of publication: _____

I chose THE FISHER because: _____

_____

What I think of my FISHER equipment: _____

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☐ You can quote me

I also own these additional hi-fi units and speakers: _____

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Please send FISHER literature to my friends, whose names appear below.

Name _____

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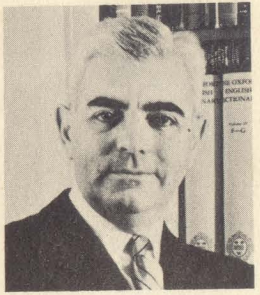
Name _____

Address _____

**WARRANTY VOID UNLESS COMPLETED AND RETURNED WITHIN 10 DAYS AFTER DATE OF PURCHASE**



## The Man Behind the Product

**AVERY FISHER**
***Founder and President,***
***Fisher Radio Corporation***

TWENTY-FIVE 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 Avery Fisher, President, Fisher Radio Corporation, Long Island City 1, New York.