OPERATING INSTRUCTIONS AND WARRANTY

THE FISHER

FM-100-B

WIDEBAND

FM Multiplex Tuner

PRICE $1.00

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-three 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.

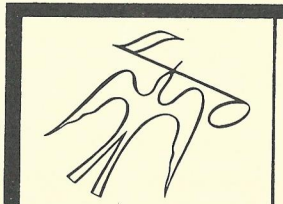
AN IMPORTANT SUGGESTION

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

1937 First high-fidelity sound systems featuring a beam-power amplifier, inverse feedback, acoustic speaker compartments (infinite baffle and bass reflex) and magnetic cartridges.
1937 First exclusively high fidelity TRF tuner, featuring broad-tuning 20,000 cycle fidelity.
1937 First two-unit high fidelity system with separate speaker enclosure.
1938 First coaxial speaker system.
1938 First high fidelity tuner with amplified AVC.
1939 First 3-Way Speaker in a high fidelity system.
1939 First Center-of-Channel Tuning indicator.
1945 First Preamplifier-Equalizer with selective phonograph equalization.
1948 First Dynamic Range Expander with feedback.
1949 First FM-AM Tuner with variable AFC.
1952 First 50-Watt, all-triode amplifier.
1952 First self-powered Master Audio Control.
1953 First self-powered, electronic sharp-cut-off filter system for high fidelity use.
1953 First Universal Horn-Type Speaker Enclosure for any room location and any speaker.
1953 First FM-AM Receiver with a Cascode Front End.
1954 First low-cost electronic Mixer-Fader.
1954 First moderately-priced, professional FM Tuner with TWO meters.
1955 First Peak Power Indicator in high fidelity.
1955 First Master Audio Control Chassis with five-position mixing facilities.
1955 First correctly equalized, direct tape-head 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.



THE FISHER FM-100-B

WIDEBAND

FM Multiplex Tuner

THE FISHER *FM-100-B* is the ideal combination of superior wide-band design and advanced multiplex circuitry — both essential for good FM stereo reception. The high gain Golden Cascode front-end, five IF stages and four limiters ensure enjoyable and distortion-free monophonic and stereophonic reception — even from distant and weak stations.

The multiplex section of the *FM-100-B* is unsurpassed for convenience and high quality performance. Included in the design is the exclusive FISHER STEREO BEACON, which *automatically* signals the presence of a stereo program on the air. A unique noise filter, which has no effect on the frequency range of the music signal, is used to suppress noise on the stereo subcarrier when reception conditions are poor. Muting of inter-station noise is effective on both monophonic and stereophonic programs, and is adjustable from the front panel. The Automatic Switching System, included in the multiplex section, makes manual switching between stereo and mono programs completely unnecessary.

A tuning meter is included for maximum tuning accuracy, and a Local-Distant switch prevents overloading on strong local stations while permitting full sensitivity for reception of weaker signals. In addition, an output level control is provided for each channel to permit precise balancing of the stereo channels. Most important of all, however, is the craftsmanship and the painstaking care which go into each Fisher unit. You can be sure that your *FM-100-B* has been checked and re-checked each step of the way, and that it has met stringent Laboratory Standards in each particular before leaving the factory. By purchasing the best, you have assured yourself of many years of pleasurable and trouble-free radio listening.

FM MULTIPLEX STEREO

FM BROADCASTING has a frequency range far in excess of the normal hearing range. For example, Fisher wide-band tuners have a frequency range which extends to 75 kc, while the normal hearing range does not exceed 17 kc. This extra "space" in the frequency response has now been put into service for the transmission of a second and third signal simultaneously with the main carrier. The third (and highest) signal is used in commercial applications (for background music) and will not be received on home high fidelity equipment. The other two signals, however, are used for the reception of stereo programs. During multiplex broadcasts, the main carrier, which can be picked up by any FM tuner or receiver, contains the sum or blended signal from both stereo channels (left plus right). The second, supersonic signal contains the information necessary for stereo. This system makes it possible for an ordinary FM set to receive a fully balanced monophonic program during multiplex transmission. At the same time, however, the circuits of the *FM-100-B*

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separate the two stereo channels from the main and stereo transmissions, thus providing you with all the added benefits of full stereo sound.

Because FM multiplex requires new equipment and new techniques at FM broadcasting stations, it is to be expected that not all programs will be of the same high technical calibre during the first few months. Such occasional problems as may arise initially will no doubt be solved quickly, as the stations gain experience with the new procedures. It is important to keep in mind, however, that the stereo subcarrier is inherently more noisy than the main carrier. In order to receive weak or distant stations with acceptably low noise levels, you may find it necessary to change to an antenna with higher gain, or to relocate your present antenna in a more favorable position.

INSTALLING THE FM-100-B

THE FISHER *FM-100-B* is designed to operate on *AC only*, at 105-120 volts, 50-60 cycles. It may be mounted horizontally or vertically (but not on its side) in any location which will provide sufficient ventilation. The *FM-100-B* should never be completely enclosed and should never be installed above other heat-producing equipment, such as amplifiers. Sufficient room should be left between the bottom plate and the supporting surface for the circulation of air underneath the chassis. This can be accomplished by using the plastic feet supplied or by using two wooden strips in custom installations. (See page 6 for additional information concerning custom installations.) Installation of the *FM-100-B* can be accomplished in the following four easy steps.

1. Connect the FM antenna to the two screw terminals marked FM ANTENNA on the rear panel, as shown in Figure 1. The folded dipole antenna supplied with the *FM-100-B* should be more than adequate for most areas. The arms of this antenna should be horizontal, in a straight line, and away from all large metal objects and electrical wiring. After the antenna has been connected and the *FM-100-B* put into operation, the antenna should be rotated horizontally, to determine the orientation for best reception. In apartment buildings and other buildings using

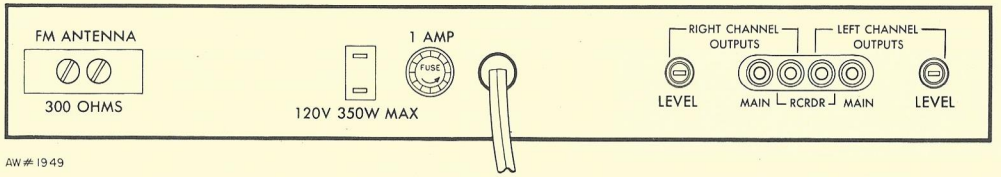

FIGURE 1. Rear panel of the FM-100-B.

steel structural supports, reception can be improved by placing the antenna close to a window. If tacks or staples are used to fasten the antenna in place, be sure that they do not contact the two conductors running along each edge of the antenna wire and avoid fastening the antenna directly to a wall. In a *strong* signal area, the antenna may be placed under a carpet, but as a general rule, reception improves as the height of the antenna is increased. The antenna should never be folded or coiled.

FM multiplex reception requires stronger signals to achieve the same low noise levels as you are used to from ordinary monophonic programs. You may find, therefore, that placement of the antenna may have to be improved for good multiplex reception. In some cases, especially in fringe areas, an outdoor rooftop antenna or even a highly directional yagi type may be needed for multiplex reception, even though the indoor antenna suffices for monophonic transmissions.

2. Using one of the two shielded phono cables supplied with the *FM-100-B*, connect the jack on the rear panel marked MAIN under RIGHT CHANNEL OUTPUTS to the Channel B Tuner input jack of your amplifier. (Up to 10 feet of cable may be used for this connection.) The other shielded cable should be connected from the jack marked MAIN under LEFT CHANNEL OUTPUTS to the Channel A Tuner input jack on your amplifier. (Up to 10 feet of cable may also be used for this connection.) *All connections must be made with shielded audio cable, tipped with standard RETMA phono plugs.*

3. Connect the AC power cable to any receptacle supplying 105-120 volts at 50 to 60 cycles. Maximum power consumption is 45 watts.

4. OPTIONAL CONNECTION FOR TAPE RECORDER: If you wish to make tape recordings, either stereo or monophonic, directly from the *FM-100-B*, connect the corresponding tape recorder inputs to the RCRDR output jacks on the *FM-100-B*. The single input of a monophonic recorder may be connected to either RCRDR jack.

Level Set Adjustment

The two Level sets on the rear panel should be adjusted for equal volume levels on a stereo multiplex program. After reading the following pages on operating the *FM-100-B*, turn it on and tune to a monophonic broadcast. With the Selector at STEREO-MONO AUTOMATIC, the Balance control on your amplifier at the center position, and the Mode Selector on your amplifier set for stereo operation, adjust the two level sets for equal sound output from both speakers. This adjustment should be started with both level sets fully clockwise. The level sets control both the MAIN and RCRDR output jacks.

OPERATING THE FM-100-B

YOUR FISHER *FM-100-B* is now ready for operation. We recommend that you read this section carefully, however, in order to obtain optimum results.

Sensitivity

The Sensitivity switch has three positions:

AC OFF: In this position, the power to the *FM-100-B* is disconnected.

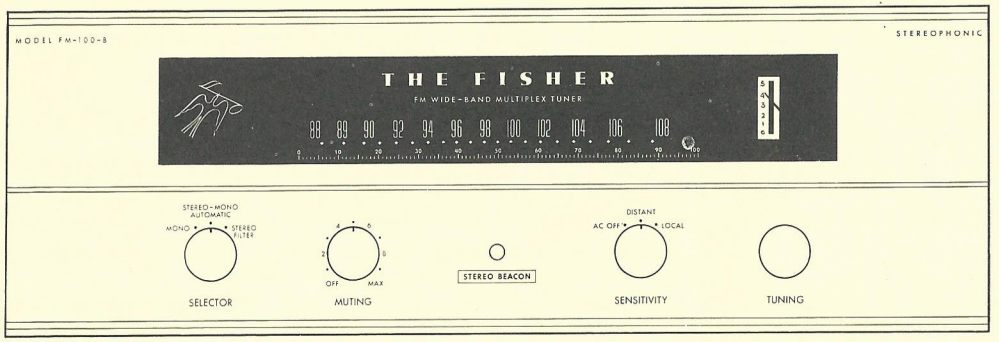

FIGURE 2. Front panel of the FM-100-B.

DISTANT: This position turns on the power to the *FM-100-B* and sets the sensitivity at the proper level for reception from normal and distant stations. In most cases, you will find that this position provides the best over-all reception of the stations in your area.

LOCAL: This position is used in very strong signal areas, to prevent overloading of the sensitive input circuits of your *FM-100-B*. If a strong local station appears at several places along the band with the Sensitivity switch in the DISTANT position, use the LOCAL position. Switch back to the DISTANT position, however, when attempting to receive normal and weaker signals.

Selector

MONO: This position is used to disable the Automatic Switching feature of the *FM-100-B*. Under extremely rare circumstances, a very weak multiplex stereo signal may cause intermittent operation of the Automatic Switching circuits. This can be prevented by turning the Selector to the MONO position.

STEREO-MONO AUTOMATIC: *Use this position for listening to both multiplex stereo and ordinary monophonic programs.* The STEREO BEACON will light whenever a multiplex program comes on the air, and the *FM-100-B* will automatically switch into the stereo mode. When the station reverts to monophonic operation, the *FM-100-B* will automatically switch to the monophonic mode and the monophonic signal will appear at both tuner outputs. At the same time, the STEREO BEACON will be turned off. This feature makes manual switching unnecessary when an FM station alternates between monophonic and stereo selections. The Mode Selector of your amplifier should be left in the Stereo position for *both monophonic and stereophonic FM broadcasts.*

STEREO FILTER: Use this position for listening to a *stereophonic* program, only when background hiss from a weak station interferes with the program being broadcast. If the Stereo Filter does not remove the noise, try the High or Scratch Filter (and the Treble control) on your amplifier. If this proves unsatisfactory, turn the Selector to MONO, for monophonic reception of the stereo multiplex program. Since the stereo information channel is inherently more susceptible to noise than the main channel, the noise level of a multiplex stereo program will decrease when it is heard monophonically.

Muting

1 — With the Muting control at OFF, tune between stations to a position which gives an average amount of interstation noise and hiss.

2 — Turn the Muting control slowly clockwise to a position just a bit beyond the point where the noise disappears. This setting will eliminate interstation noise while permitting you to hear even very weak stations. By turning the control further, you will mute progressively stronger stations.

Tuning

The Tuning knob selects FM stations in the 88 to 108 megacycle band. Turning the knob will move the pointer across the dial scale and vary the tuning meter. Each station should be tuned for a maximum indication on the tuning meter. When this point is reached, optimum reception is assured. For your added convenience, a logging scale with linear divisions from 0 to 100 is included under the tuning dial. By making a note of the location of your favorite stations on this linear scale, you will be able to tune to them more quickly and accurately.

To find a multiplex program, simply tune slowly across the band with the Selector switch at STEREO-MONO AUTOMATIC. When you reach a station broadcasting a multiplex stereo program, the STEREO BEACON will light and the *FM-100-B* will automatically switch into the stereo mode. Provided your amplifier is set for stereo reproduction, you will instantly hear the program in stereo sound, without the need for any manual switching.

NOTE: For a limited time, some stations, which broadcast subscriber background music in addition to normal programming, will transmit a signal which may cause the STEREO BEACON to light. The background music channel, intended only for subscribers, cannot be received on the *FM-100-B*. Such stations, however, also broadcast a normal monophonic signal intended for the general listening public. If the STEREO BEACON lights on such a station, turn the Selector to MONO for normal reception.

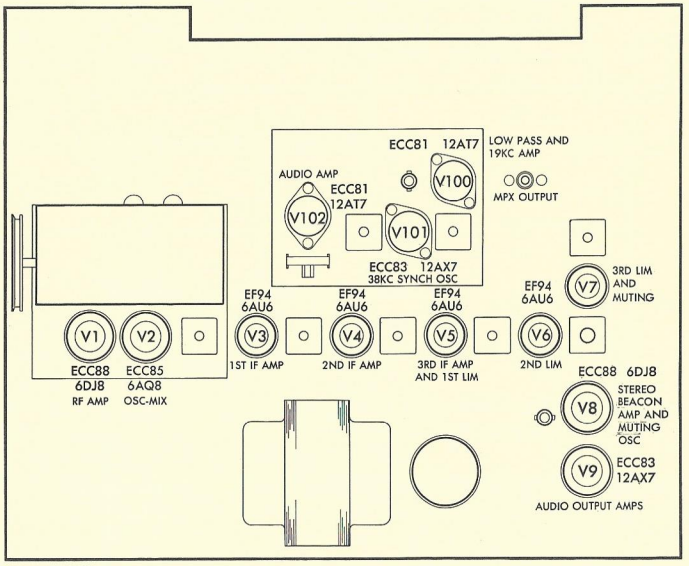

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FIGURE 3. Tube layout chart.

SERVICE NOTES

Replacing Dial Lamps

The front panel can easily be removed to replace the dial lamps. First disconnect the AC power cord as a precaution. Remove all the knobs from the front panel. Remove the two hex nuts from the control shafts, and then lift off the panel. The lamps are held in place by spring clips and can be removed with the fingers. Replace with a new lamp from your FISHER Dealer (Part Number I 50082-7).

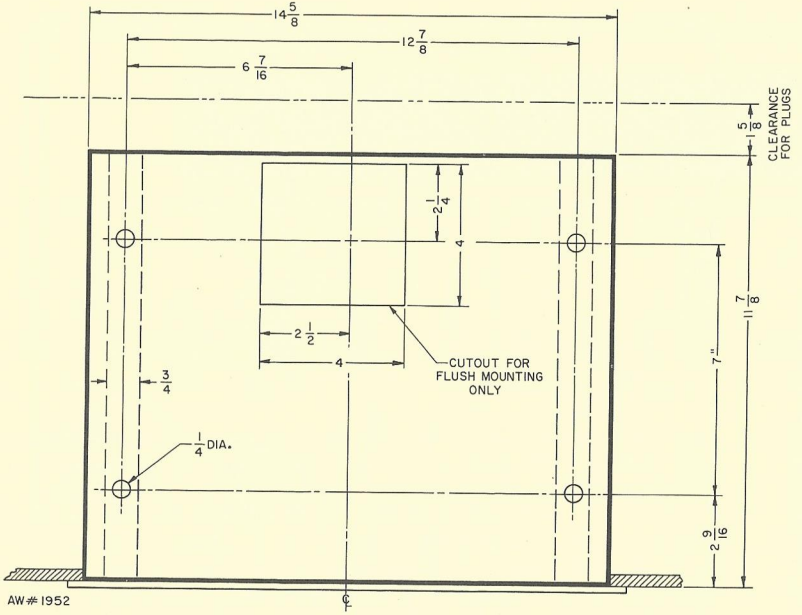

FIGURE 4. Top view of custom installation.

Cleaning the Dial Glass

1 — Remove the front panel as described in the preceding paragraph.

2 — Loosen the screws that retain the clips to the dial glass. (When you replace the dial glass, make certain to reset it in the same position it occupied before removal.) Swing the clips aside, and then lift off the glass.

3 — Remove dust with a dry rag. If you wish to clean more thoroughly, *use a soap and water solution only;* if you use any stronger cleaning agent, you may damage the markings on the glass.

CUSTOM INSTALLATION

TWO SPECIAL CUSTOM CABINETS, designed to accommodate the *FM-100-B* are available from your Fisher dealer. These are the Model MC-2 metal cabinet, and the Model 10-U wood cabinet, in walnut and mahogany. Both are attractively designed to enhance your room decor. The *FM-100-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 *FM-100-B* in a totally enclosed space,

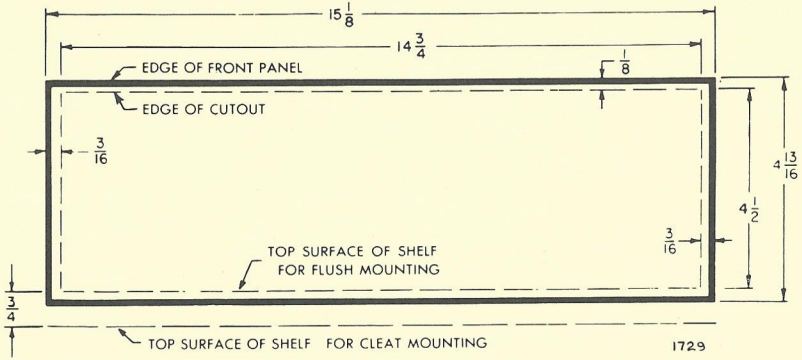

FIGURE 5. Front panel cutout.

on top of another amplifier, or too close to other heat-producing equipment. If it is installed in a cabinet, the back should remain open and not be flush with the wall. If the cabinet is equipped with ventilation grilles on top, do not block the passage of air with books or other articles.

The *FM-100-B* may be installed in two ways: with cleats, to raise it above the floor of the cabinet to provide ventilation through the perforated bottom cover; or, without cleats, in which case cut-outs must be made in the cabinet floor. The two types of installation follow:

Installing with Cleats

1 — Obtain a strip of wood ¾ inches square and 23 inches long. Cut this strip in half to form two 11½-inch cleats.

2 — Fasten the two cleats to the top of the mounting board with wood screws in the positions shown in Figure 4. The screw heads should be flush with the top of the cleats. Then locate and drill four ¼-inch holes through the mounting board and cleats as indicated.

3 — Saw a cutout through the front panel of your cabinet (4½ by 14¾) as shown in Figure 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 *FM-100-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 (see Note below) supplied in the accessories bag through the holes in the bottom of the mounting board and fasten the chassis into place.

CAUTION: The accessories bag contains two lengths of screws, 1″ and 1½″. The 1½″ screws are for use only on mounting shelves that are ¾″ thick or more. Any other use of these long screws will cause short circuits inside the chassis.

For shelves that are less than ¾″ thick, use the 1″ screws, or the even shorter ones supplied with the original plastic feet on the bottom of the chassis.

Flush Installation (No Cleats)

Cutouts must be made in the shelf beneath the chassis, and the back of the cabinet must remain open. After removing the four plastic feet from the *FM-100-B* proceed as follows:

1 — Locate and drill four holes in the mounting board of the cabinet as shown in Figure 4. These holes are ¼ inch in diameter.

2 — Saw a cutout in the shelf as shown.

3 — Saw a rectangular cutout through the front panel of the cabinet to the dimensions shown in Figure 5. Note that the bottom edge of the cutout is flush with the top of the shelf.

4 — Insert the chassis through the *front* of the panel cutout. It is *not* necessary to remove the control panel from the chassis. Slide the chassis in all the way until the back of the *FM-100-B* front panel fits tightly against the panel of the cabinet.

5 — Fasten the chassis to the shelf by means of the four one-inch mounting screws furnished in the accessories envelope for this purpose.

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

Sensitivity (20 db of quieting)	
With 72-ohm antenna	0.6 microvolt
With 300-ohm antenna	1.2 microvolts
Usable Sensitivity (IHFM standard)	1.8 microvolts
Signal-to-noise Ratio (100% modulation)	70 db
Selectivity (alternate channel)	65 db
FM Harmonic Distortion (400 cps, 100% modulation)	Less than 0.4%
Capture Ratio	2.2 db
Calibration Accuracy	0.2%
Audio Frequency Response	20-20,000 cps ±1 db
Stereo Separation (at 1 kc)	35 db
Rated Output	2 volts
Total Audio Harmonic Distortion (at rated output)	Less than 0.2%
Audio Hum (below rated output)	More than 75 db
Power Consumption (at 105-120 volts, 50/60 cps)	45 watts

N903-102

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Warranty To Owner

THE FISHER equipment you purchased was carefully tested and inspected 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 for ninety days from date of sale to the original purchaser. Any part of the equipment which under normal installation and use, discloses such a defect, will be adjusted or replaced by the dealer from whom purchased. To protect your warranty, be sure to mail this card *within 10 days* from date of purchase.

FOR WARRANTY SERVICE, CONSULT YOUR DEALER

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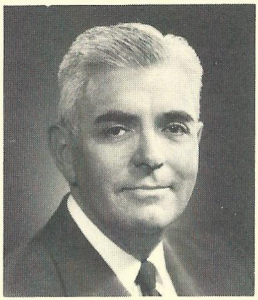

The Man Behind the Product

AVERY FISHER
Founder and President,
Fisher Radio Corporation

TWENTY-FOUR 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.