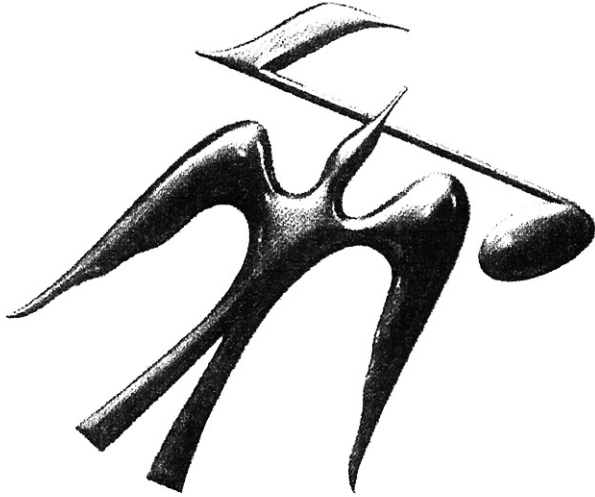


OPERATING INSTRUCTIONS AND WARRANTY



THE FISHER

MF-300

TUNE-O-MATIC

FM Stereo Motor 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-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.

- | | | | | | |
|------|--|------|--|------|---|
| 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 master audio controls and self-powered preamplifier. | 1960 | First reverberation device, for use in high fidelity equipment—The Fisher Dynamic Spaceexpander. |
| 1937 | First exclusively high fidelity TRF tuner, featuring broad-tuning 20,000 cycle fidelity. | 1956 | First to use Power Monitor in a home amplifier. | 1960 | First stereo tuner with MicroTune. |
| 1937 | First two-unit high fidelity system with separate speaker enclosure. | 1956 | First All-Transistorized Preamplifier-Equalizer. | 1960 | First FM tuner with six IF stages. |
| 1938 | First coaxial speaker system. | 1956 | First dual dynamic limiters in an FM tuner for home use. | 1960 | First FM tuner with five limiters. |
| 1938 | First high fidelity tuner with amplified AVC. | 1956 | First Performance Monitor in a high quality amplifier for home use. | 1960 | First front panel antenna selector switch, 72-300 ohm, Local-Distant positions. |
| 1939 | First 3-Way Speaker in a high fidelity system. | 1956 | First FM-AM tuner with TWO meters. | 1961 | First Multiplex units with STEREO BEACON and automatic switching, mono to stereo. |
| 1939 | First Center-of-Channel Tuning Indicator. | 1956 | First complete graphic response curve indicator for bass and treble. | 1961 | First complete receivers with Multiplex. |
| 1945 | First Preamplifier-Equalizer with selective phonograph equalization. | 1957 | First Golden Cascode FM Tuner. | 1961 | First FM-Stereo-Multiplex tuners with STEREO BEAM. |
| 1948 | First Dynamic Range Expander with feedback. | 1957 | First MicroRay Tuning Indicator. | 1961 | First loudspeaker system with frameless woofer cone, eliminating all parasitic resonance. |
| 1949 | First FM-AM Tuner with variable AFC. | 1958 | First Stereophonic Radio-Phonograph with Magnetic Stereo Cartridge. | 1961 | First internal switching system to permit immediate tape playback with use of all controls and switches. |
| 1952 | First 50-Watt, all-triode amplifier. | 1959 | First high-quality Stereo Remote Control System. | 1962 | First simplified-operation Control-Amplifier, with infrequently used controls behind front-panel cover, yet immediately accessible. |
| 1952 | First self-powered Master Audio Control. | 1959 | First complete Stereophonic FM-AM Receiver (FM-AM tuner, audio control, 40-watt amplifier). | 1962 | First loudspeaker with eddy-current-damped voice coil. |
| 1953 | First self-powered, electronic sharp-cut-off filter system for high fidelity use. | 1959 | First high-compliance plus high-efficiency free-piston speaker system. | 1962 | First bass speaker with combined serrated-aluminum and fiber cone. |
| 1953 | First Universal Horn-Type Speaker Enclosure for any room location and any speaker. | 1960 | First to use MicroRay for FM tuning and as a Recording Audio Level Indicator. | 1962 | First FM Tuner Kit with separate d'Arsonval meter for tuning and separate cathode ray stereo broadcast indicator (STEREO BEAM). |
| 1953 | First FM-AM tuner with a Cascode Front End. | 1960 | First complete stereo FM-AM receiver with 60-watt power amplifier and new 7591 output tubes. | 1962 | First Stereophonic FM Tuner with TUNE-O-MATIC Motor Tuning. |
| 1954 | First low-cost electronic Mixer-Fader. | 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. | 1962 | First Supersonic Wireless Remote Control in a high fidelity component. |
| 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. | | | | |



THE FISHER MF-300

TUNE-O-MATIC

FM Stereo Motor Tuner

BY SELECTING the FISHER *MF-300* for inclusion in your home entertainment system, you have brought into your home a music reproducing instrument of surpassing quality that will provide you with many years of listening enjoyment. The *MF-300* is a prime example of the genius for engineering that has kept the FISHER name in the forefront of the high fidelity field. It includes the new TUNE-O-MATIC circuit for automatic station selection, by remote control if desired. Critical tuning is accomplished automatically by a specially designed, center-of-channel detector which stops the motor-powered tuning mechanism at the point of maximum fidelity. The need for a tuning meter is obviated—actual extended use tests in the Fisher Laboratories have shown that with wide-band, low-distortion tuners such as the FISHER, the TUNE-O-MATIC circuit tunes, on the average, *three times* more accurately than the most painstaking manual tuning with the aid of a meter. In addition, the TUNE-O-MATIC feature permits you to select stations with the RK-10 remote control included with your *MF-300*. A wireless remote control, Model RK-20, is also available separately and will permit you to vary volume *continuously in both directions* and turn your entire high fidelity installation off and on, in addition to remote tuning. The new illuminated dial pointer permits across-the-room visibility.

The *MF-300* includes, in addition to its extraordinary convenience features and precise, automated tuning, the most sensitive and distortion-free FM circuitry ever developed. The usable sensitivity of

the *MF-300*, according to IHFM standards, is a remarkable 1.6 microvolts. This is achieved by the use of the famous FISHER Golden Cascade front-end with *four* tuned circuits, followed by *five* IF stages, with *five* limiters (including a germanium dual-diode dynamic limiter). The multiplex section of the *MF-300* utilizes the superior time-division system to decode the multiplex signal. The result is distortion-free stereo sound with typical measured channel separation across the mid-band frequencies of 35 to 40 db.

The FISHER STEREO BEACON*, which automatically signals the presence of a stereo program and switches between stereo and mono operation, is an integral part of the *MF-300*. A new circuit using four silicon diodes provides completely silent switching—no clicks or pops are ever heard from the speakers. Also included is a three-position Muting switch to suppress noise between stations and to adjust the sensitivity of the TUNE-O-MATIC circuit to suit local receiving conditions. AFC is used to correct the infinitesimal tuning errors of the TUNE-O-MATIC circuit, thus achieving *exact* center channel tuning, an important consideration for optimum stereo reception. Since the tuning circuits of the *MF-300* are already fully temperature-compensated (maximum drift without AFC, 0.02%), AFC is not needed to compensate for instability. Other features include a Stereo Filter to eliminate noise on stereo programs from weak stations, an Antenna switch to adjust the input sensitivity of the *MF-300* for optimum results in different areas, separate tape recorder

*PATENT PENDING

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outputs as well as individual volume level controls for each channel.

Most important of all, the *MF-300* is carefully constructed of the very best materials available. It is built to render a lifetime of faithful service, and every effort has been exerted to achieve maximum durability in every respect. You can be sure that your FISHER has been checked and rechecked each step of the way, and that only those units which meet or exceed our published specifications ever leave the factory. It is in this way that the FISHER reputation for the highest quality and reliability has been established through the past quarter of a century.

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 20 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 *MF-300* separate the two stereo channels from the complex transmitted signal, thus providing you with all the added benefits of full stereo sound.

Because FM multiplex is a more complex form of broadcasting than ordinary FM, it accentuates several problems inherent in the FM system. One problem is that the stereo information carrier is inherently more noisy than the main carrier. Thus you may find it necessary to change to an antenna with higher gain, or to relocate your present

antenna in more favorable position, in order to receive weak or distant stereo stations with acceptably low noise level. *This may be true even though the same stations are received satisfactorily when broadcasting monophonically.* Because of the extremely high sensitivity and outstanding limiting action of the *MF-300*, however, the use of an outdoor antenna is dictated only under the most difficult conditions. A second problem connected with multiplex transmission, is multipath reception. This condition, which causes "ghosts" on a TV screen, is the result of the signal being reflected from large buildings and other surfaces. Since it causes distortion and loss of stereo separation, it is important to rotate the antenna to the position which produces the cleanest sound. For more information on the connection of antennas, see below.

INSTALLING THE MF-300

THE FISHER *MF-300* 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 *MF-300* 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 9).

Five-Step Installation Procedure

1 — Connect the FM antenna to the two screw terminals marked 300 ohms on the rear panel as shown in Figure 1. The folded dipole antenna supplied with the *MF-300* should be more than adequate for most areas. The arms of this antenna should be mounted horizontally, in a straight line, and away from all large metal objects and electrical wiring. Because of the complexity of FM transmission patterns, which are affected by the local terrain, buildings and weather, no definite rules can be given on the precise optimum location of the antenna. The best procedure is to rotate the antenna while listening

to an FM stereo program and leave the antenna pointing in the direction which provides the cleanest response. 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. Mount the antenna on strips of wood, which can then be fastened to the wall. In a strong signal area, the antenna may be placed under a carpet, but as a general rule, reception greatly improves as the height of the antenna is increased. The dipole antenna should never be folded or coiled. In some fringe areas, the use of an outdoor, highly directional yagi antenna may be necessary. An antenna rotator is usually necessary if such an antenna is to be used to receive stations from different locations.

2 — Using one of the two shielded phono cables supplied with the *MF-300*, connect the jack on the rear panel marked MAIN under RIGHT OUTPUTS to the Right (or Channel B) tuner input jack of your amplifier. The other shielded cable should be connected from the jack marked MAIN under LEFT OUTPUTS to the Left (or Channel A) Tuner input jack of your amplifier. (Up to 25 feet of cable may be used for each connection.) If the cables supplied with the *MF-300* are not used, be sure to substitute shielded audio cables tipped with standard RETMA phono plugs.

3 — Connect the cable from the remote control, Model *RK-10* (or the optional wireless remote control receiver, Model *RK-20*) into the jack on the rear panel of the *MF-300* marked REMOTE TUNING. *Be sure that the two colored dots are lined up before trying to insert the jack.*

4 — Connect the AC power cable to any receptacle supplying 105-120 volts at 50 to 60 cycles. Plugging the power cord into a convenience outlet on your amplifier will permit you to turn the tuner and amplifier on and off together with the amplifier power switch.

5 — **OPTIONAL CONNECTION FOR TAPE RECORDER:** If you wish to make tape recordings, either stereo or monophonic, directly from the *MF-300* connect the corresponding tape recorder inputs to the RCRDR output jacks on the *MF-300*. The single input of a mono-

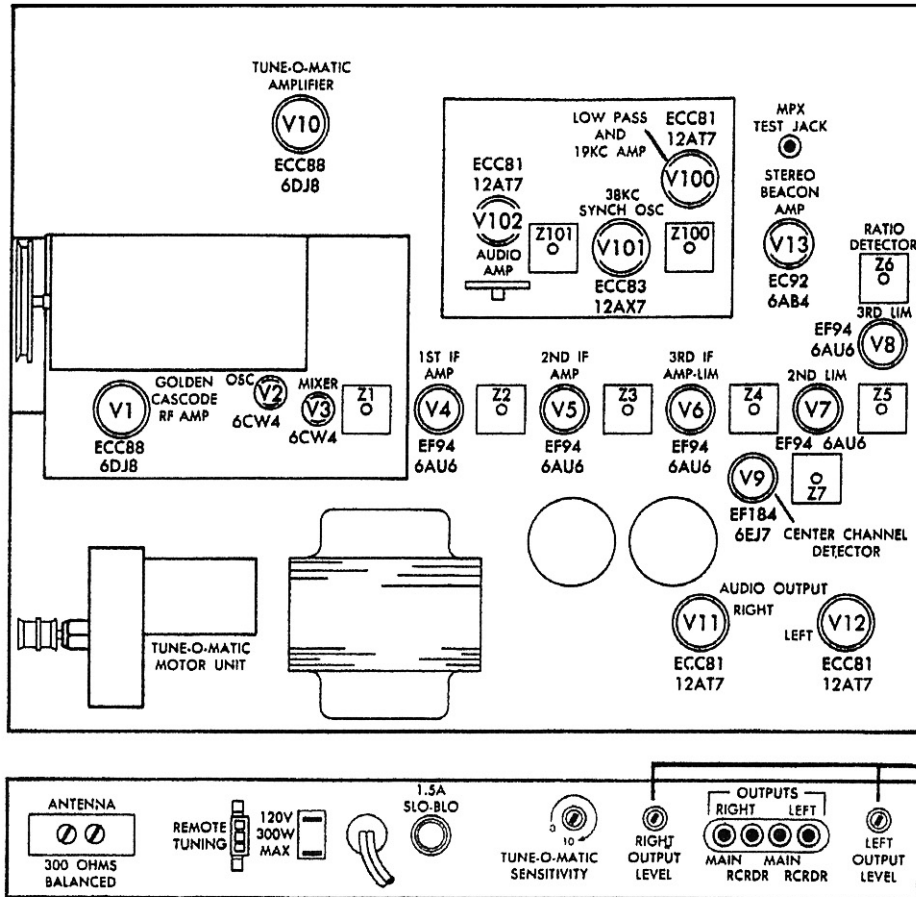


FIGURE 1. Rear panel and tube layout.

INS 156

phonic recorder may be connected to either RCRDR jack.

OPERATING THE MF-300

YOUR FISHER *MF-300* is now ready for operation. We strongly recommend, however, that you read this section carefully before turning the set on, in order to obtain optimum results and eliminate the possibility of confusion.

NOTE: The STEREO BEACON will light as soon as power is applied to the *MF-300*, and it will remain on during the warm-up period. As soon as the tuner is ready for operation, the STEREO BEACON will turn off (unless, of course, your *MF-300* is receiving a multiplex stereo program).

1 Antenna and Power Switch

AC OFF: In this position, the power to the *MF-300* is disconnected.

NORMAL: This position turns on the power to the *MF-300* 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 only in very strong signal areas, to prevent overloading of the sensitive input circuits of your *MF-300*. If a strong local station appears at several places along the band with the Antenna switch in the NORMAL position, use the LOCAL position. Switch back to the NORMAL position, however, when attempting to receive signals of normal and weak strength.

2 TUNE-O-MATIC and Manual Tuning

The two TUNE-O-MATIC pushbuttons are located on the front panel. The arrow above each one indicates the direction of dial pointer travel it controls. If you wish to stop at the next station on the dial, press the pushbutton lightly and release immediately; a light

tap is all that is necessary. If you wish to bypass several stations to reach a station further along the band, press the appropriate pushbutton and hold it in until the pointer approaches the station you desire. Then remove your hand from the pushbutton. The pointer will stop at the next station and the Station Indicator will light up indicating that the TUNE-O-MATIC has tuned perfectly to the exact center of the channel. You can change the direction of the pointer travel at any time, even while the pointer is in motion, by simply pressing the pushbutton for the desired direction. When the pointer reaches the end of the FM band (either upper or lower), the pointer will automatically reverse and proceed in the opposite direction to the next station. The two tuning pushbuttons on the wire remote control, Model RK-10, are simply an extension of the TUNE-O-MATIC pushbuttons on the *MF-300* and operate in exactly the same way.

You can also tune stations manually by using the Tuning knob. The Station Indicator will light when you are correctly tuned to a station. Tune slowly as you approach the desired station and stop as soon as the Station Indicator lights. If you use the Tuning knob to reach the upper or lower limit of the band, the automatic return mechanism will be activated and the pointer will automatically start back in the opposite direction. Do not attempt to stop the dial pointer with the Tuning knob while the motor is in operation since this will cause unnecessary strain on the dial cord.

For the greatest tuning accuracy, we recommend that you use the TUNE-O-MATIC pushbuttons on the tuner or the remote control.

The FISHER STEREO BEACON is an integral part of the tuning mechanism. When the TUNE-O-MATIC circuit stops at a station broadcasting a stereo multiplex program, the STEREO BEACON will light and the *MF-300* will automatically switch into the stereo mode. At the conclusion of the program the STEREO BEACON will turn off and the tuner will revert to monophonic operation. Provided the Selector switch is in the AUTOMATIC position, no manual switching is necessary.

3 Selector

MONO: This position is used to disable the Automatic Switching

feature of the *MF-300*. 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.

AUTOMATIC: Under normal conditions, 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 *MF-300* will automatically switch into the stereo mode. When the station reverts to monophonic operation, the *MF-300* 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: This position locks the *MF-300* in the stereo mode (STEREO BEACON remains on). It is ordinarily not necessary to use this position since the *MF-300* automatically switches to stereo whenever a multiplex signal is received (with the Selector at AUTOMATIC). In rare circumstances, however, heavy air traffic or short-time signal fading may cause the STEREO BEACON circuit to switch back and forth between stereo and mono — even on signals that are normally strong enough for pleasurable stereo listening. Under such conditions, the STEREO position will permit you to listen to multiplex programs in full stereo sound. At the conclusion of the stereo program, be sure to return the Selector to the AUTOMATIC position, since the noise level is increased when listening to monophonic programs with the Selector at STEREO.

4 Muting

The Muting control has two functions. It not only eliminates the characteristic FM rushing noise between stations, but it also provides three degrees of sensitivity for the TUNE-O-MATIC circuit.

OFF: In this position, inter-station noise is not suppressed. When

using the TUNE-O-MATIC pushbuttons (or the remote control) to tune, the dial pointer will stop at every station received on the band, even those so weak that the noise level is too high for enjoyable listening.

NORMAL: This position should be used for all normal reception. It suppresses inter-station noise, and causes the TUNE-O-MATIC circuit to stop at all stations with a usable signal. At the same time, it causes the TUNE-O-MATIC to bypass weak, unlistenable stations.

MAX: Provides maximum suppression of inter-station noise and causes the TUNE-O-MATIC to stop only at the strongest stations on the band. This position is included for use mainly in areas where high signal interference and a high incidence of man-made noise signals (such as are generated by electric power plants, and automobiles on heavily travelled thoroughfares) causes interference with stations of moderate signal strength.

5 AFC

Automatic Frequency Control is provided on the *MF-300*, but not to prevent drifting of the tuning circuits. These circuits are fully temperature compensated and will not drift more than 0.02% under any circumstances if installed correctly. The sole purpose of the *MF-300's* moderate AFC action is to assure absolutely correct tuning to the exact center-of-channel position. Tests in our laboratories have shown conclusively that the TUNE-O-MATIC system with AFC is three times more accurate in locating the center channel position than the most careful manual tuning with the aid of a meter. This is especially important when receiving stereo multiplex programs, since channel separation, noise suppression and fidelity are greatly improved when the precise center channel position is found.

OFF: This position, which disables the AFC, has two uses. If you wish to tune manually (with the Tuning knob) instead of using the TUNE-O-MATIC pushbuttons, use the OFF position while tuning. After reaching the station you desire, turn the AFC switch back to NORMAL. The second use of this position is to prevent "pull-in" of a strong station, adjacent to a weaker station you wish to hear.

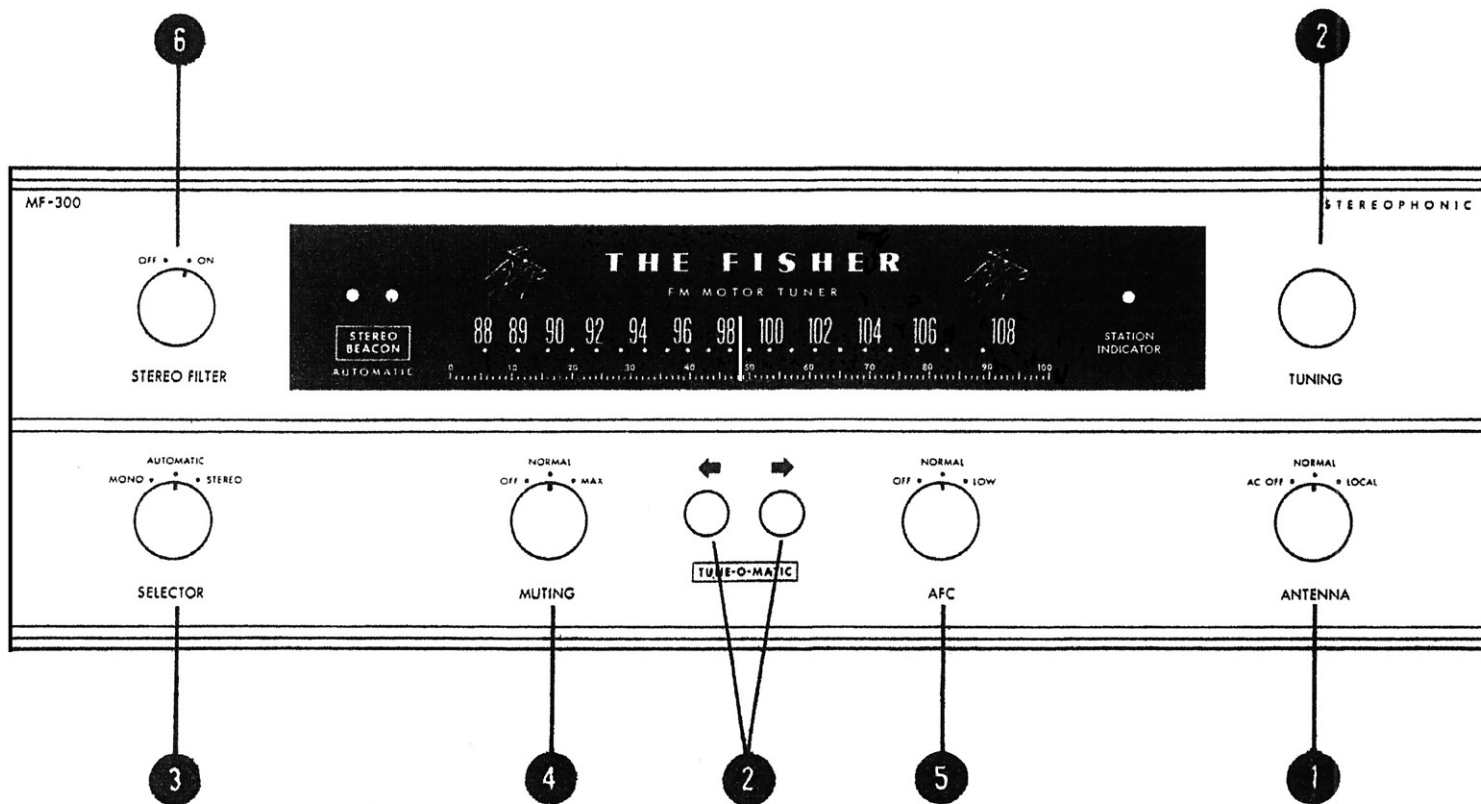


FIGURE 2. Front panel.

If the two stations are very close in frequency, turn to the LOW position. If this still occurs, use the OFF position to receive the weaker station.

NORMAL: Use this position for all normal reception. A carefully chosen amount of AFC is applied *after* the TUNE-O-MATIC circuit has tuned in the station for you. For greater tuning accuracy, the AFC is automatically disabled during the tuning cycle, and reapplied when the Station Indicator light goes on.

LOW: This position supplies a more moderate amount of AFC than the NORMAL position. It is used to prevent pull-in of a strong station adjacent to a weaker station. If you detect this condition, first try the LOW position, and if pull-in is still observed, switch to the OFF position.

6 Stereo Filter Switch

Use this switch when listening to a *stereophonic* program from a weak station with a background noise level sufficient to interfere with your enjoyment of the program. If the Stereo Filter switch 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 of the *MF-300* to the MONO position for monophonic reception of the stereo multiplex program.

7 Level Controls (See page 4)

After you have become familiar with the operation of the *MF-300*, you should adjust the Level Controls on the rear panel to balance the two stereo channels and to provide the proper output level for your amplifier. These controls have been set at the factory in the maximum position (fully clockwise as viewed from the rear).

1 — Play a record on your record player and tune in a station of approximately average sound level on the *MF-300*.

2 — Switch between the record and the FM station and adjust the Level controls on the rear of the *MF-300* for equal levels from each sound source.

3 — Now switch between the Left and Right channels of the *MF-300* and adjust the Level controls for equal volume from each channel.

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-50441-3).

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 by placing it firmly against the lower left-hand corner.) 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.

Replacing the Dial Pointer Light

1 — Remove the *MF-300* from its cabinet so that the top of the chassis is easily accessible.

2 — Remove the front panel and dial glass as described in the preceding paragraphs.

3 — The two wires from the dial pointer light are connected to two Fahnestock clips on the top chassis, behind the front panel. Release the wires by pressing down on the clips. Then remove the wires from the small hook clip on the rear of the pointer base. (See Figure 3.)

4 — Remove the dial pointer (bulb plus metal guard), by sliding it

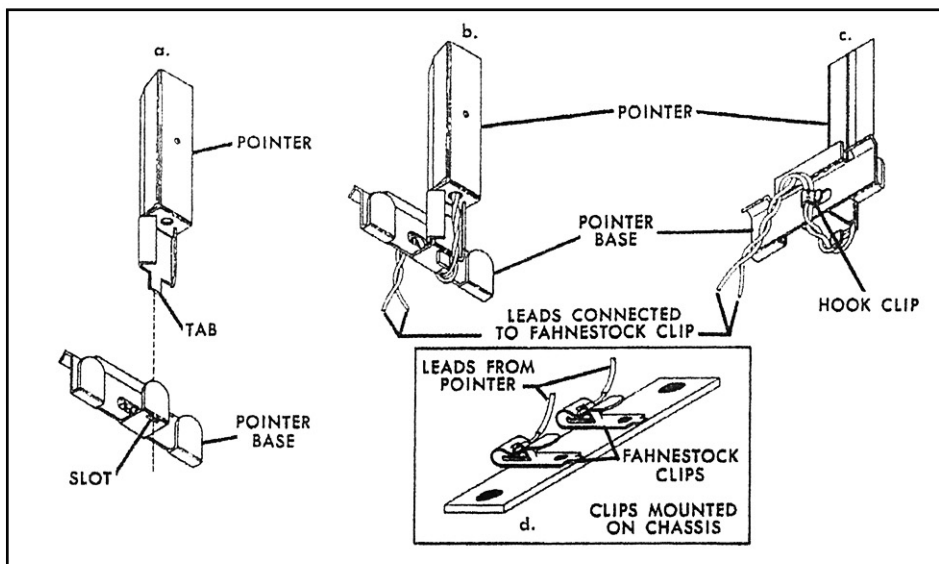


FIGURE 3. Correct positioning of the dial pointer light.

directly upward, as shown in Figure 3.

5 — Slide the new dial pointer downward, while pressing upward on the pointer base, until the pointer reaches its lower limit. The tab on the pointer should mate with the slot on the pointer base.

6 — Twist the two wires together and slip them through the hook clip on the rear of the pointer base. Be sure to avoid leaving any slack in the wire underneath the pointer. (See Figure 3.)

7 — Secure the ends of the two wires to the Fahnestock clips by pressing on the clips, placing the tip of the wires in the clip aperture, and then releasing.

8 — Replace the dial glass and front panel and return the *MF-300* to its cabinet.

CUSTOM INSTALLATION

TWO SPECIAL CUSTOM CABINETS, designed to accommodate the *MF-300* are available from your FISHER dealer. These are the Model MC-2 metal cabinet and the Model 10-U wood cabinet in walnut or mahogany. Both are attractively styled to enhance your room decor. The *MF-300* 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 *MF-300* in a totally enclosed space, on top of an 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

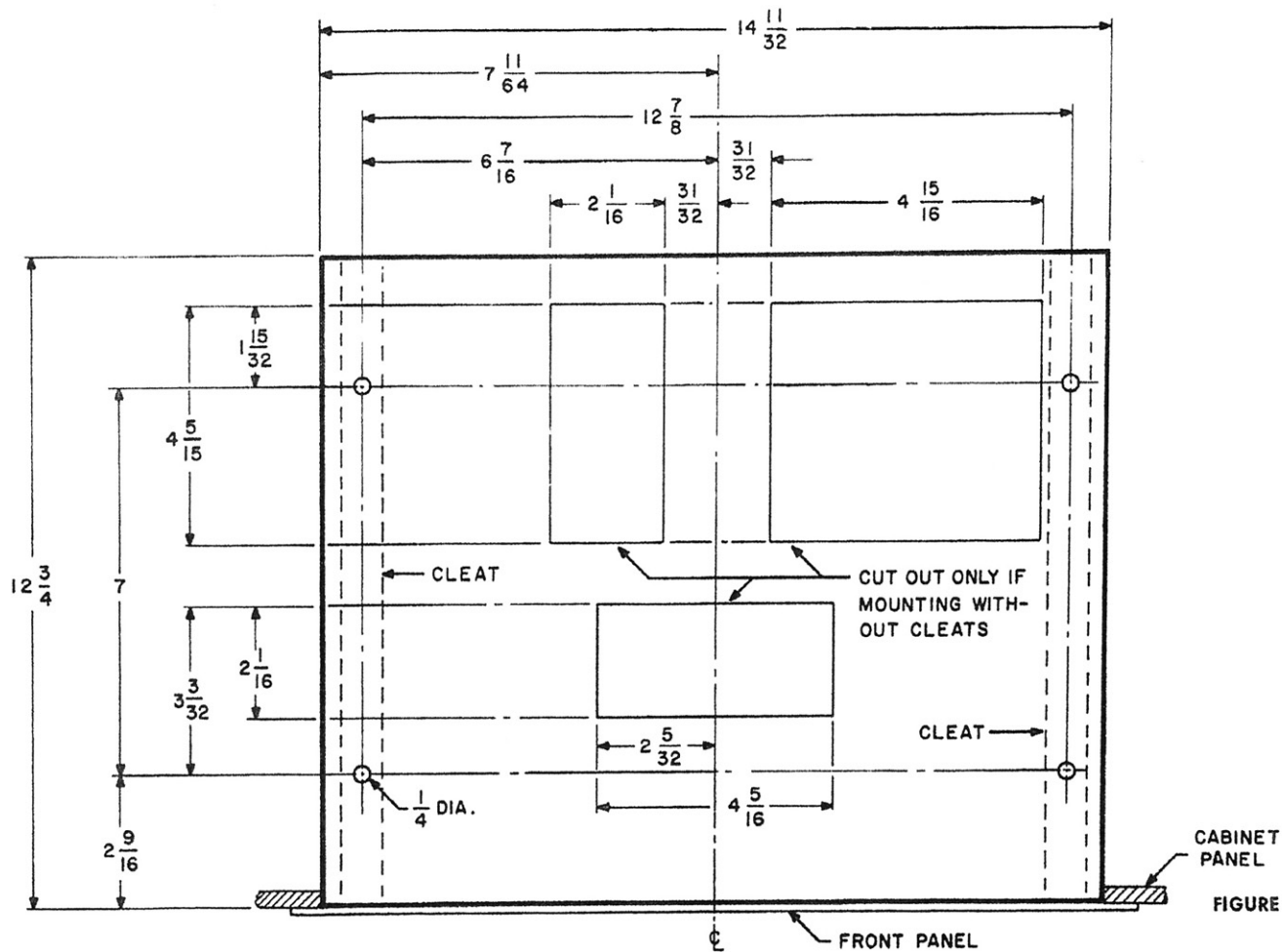


FIGURE 4. Custom installation.

on top, do not block the passage of air with books or other articles.

The *MF-300* may be installed in two ways: with cleats, to raise it above the shelf 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 shelf.

Installing with Cleats

- 1 — Obtain a strip of wood $\frac{3}{4}$ -inch square and 23 inches long. Cut this strip in half to form two $11\frac{1}{2}$ -inch cleats.
- 2 — Fasten the two cleats to the top of the mounting board as shown in Figure 4 with wood screws. The screw heads should be flush with the top of the cleats. Then locate and drill four $\frac{1}{4}$ -inch holes through the mounting board and cleats as shown.
- 3 — Saw a cutout through the front panel of your cabinet ($4\frac{1}{2}$ by $14\frac{3}{4}$ inches) 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 *MF-300* 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 $1\frac{1}{2}$ -inch screws (see CAUTION 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-inch and $1\frac{1}{2}$ -inch. The $1\frac{1}{2}$ -inch screws are for use only on mounting shelves that are $\frac{3}{4}$ -inch thick or more. Any other use of these long screws will cause short circuits inside the chassis.

For shelves that are less than $\frac{3}{4}$ -inch thick, use the 1-inch 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 *MF-300* proceed as follows:

- 1 — Locate and drill four $\frac{1}{4}$ -inch diameter holes in the mounting board of the cabinet as shown in Figure 4.
- 2 — Saw the three cutouts shown in Figure 4 in the positions shown. It is absolutely essential that these cutouts be made in order to assure the many years of trouble-free service that the *MF-300* normally provides.
- 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 *MF-300* front panel fits tightly against the panel of the cabinet.
- 5 — Fasten the chassis to the shelf by means of the four 1-inch mounting screws furnished in the accessories envelope for this purpose.

FOR THE TECHNICALLY MINDED

The *MF-300* represents the culmination of two parallel engineering efforts. One was to design a state-of-the-art tuner as another FISHER contribution to the technology of tuner design. The second was to make this tuner completely automated by introducing highly sophisticated servomechanisms and feedback control circuits. The result is a tuner far ahead of the field both in performance and convenience.

The front-end of the *MF-300* utilizes the low-noise cascode design with a specially developed frame grid double triode, the second stage of which is connected as a grounded grid amplifier. *Four* tuned circuits, instead of the ordinary three, are used in the RF amplifier for extra

selectivity and rejection of all types of interference. The oscillator and mixer stages use two of the new RCA Nuvistor tubes, which improve the over-all signal-to-noise ratio and temperature stability of the front-end to remarkably high values.

The IF section consists of five amplifying stages with four double-tuned, selective circuits. They include three short time-constant grid limiters and a solid-state, dual-diode dynamic limiter. These stages are followed by a solid-state, wide-band ratio detector which also acts as a limiter. Between-station muting is accomplished by a separate circuit which supplies a bias voltage that cuts off the last IF stage when the antenna input signal drops below a value determined by the Muting switch.

The AFC voltage is derived from the ratio detector. A varicap diode is used to control the resonant frequency of the oscillator's tuned circuit. Different degrees of AFC action are selected by a three-position switch and the AFC is automatically defeated during the TUNE-O-MATIC tuning cycle by a motor-operated micro-switch. In addition, the newly developed FISHER AFC circuit restricts the range of AFC action to a small portion of the frequency spectrum around each station without decreasing the AFC correction ratio. (In

fact, it permits an increase in the AFC strength.) This device makes it almost impossible to override weak stations adjacent to powerful ones.

The output of the ratio detector is divided and sent along two parallel paths. One path is through a de-emphasis network and the other passes through the multiplex demodulator section. The multiplex section utilizes the superior time-division system in which two balanced semiconductor bridges are alternately switched by the output of a 38-kc synchronous oscillator. Channel separation of this system, as shown in Figure 8, is considerably greater than that obtained with other types of demodulators. The balanced diode bridge system also reduces noise and distortion to virtually the theoretical minimum.

The signals from the multiplex demodulator and from the de-emphasis network are sent to the STEREO BEACON circuit. During monophonic programs, this circuit feeds the signal from the de-emphasis network to the audio output stages for both channels. When a stereo signal appears, however, a tuned circuit, amplifier and rectifier detect the 19-kc pilot carrier (transmitted *only* during a stereo broadcast) and converts it to a DC voltage which activates the STEREO BEACON relay (and the BEACON light). The relay, in turn, causes a silicon-diode switching circuit to feed the two channel outputs of the multi-

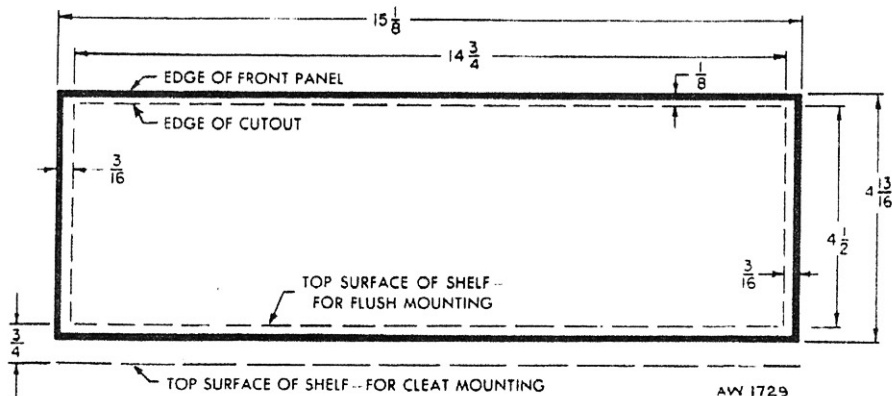


FIGURE 5. Front panel cutout.

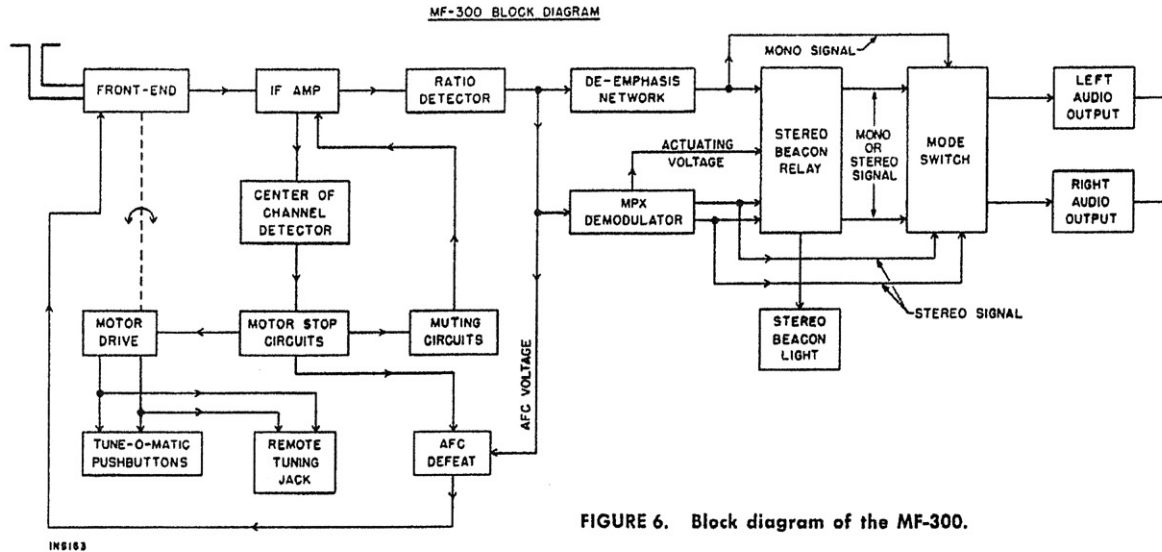


FIGURE 6. Block diagram of the MF-300.

plex demodulator to the audio output stages. Because the actual switching is accomplished by the silicon diodes, it is a completely silent operation.

A simplified block diagram of the TUNE-O-MATIC circuit is shown in Figure 6. The tuning cycle begins when the Motor Drive is activated by the TUNE-O-MATIC pushbuttons or the remote control. The motor turns the tuning capacitor shaft in the desired direction until the center-of-channel detector produces a signal which cuts off the motor. This signal is produced a split-second before the center channel position is reached, thus allowing for a calculated amount of inertia inherent in the motor and drive system. When the motor is stopped, the AFC is switched on and the Muting circuit is defeated. As the Muting voltage blocking the last IF stage decays, the station emerges out of

a completely silent background and the Station Indicator is turned on. It is possible to override the Motor Stop circuit by keeping one of the pushbuttons depressed and to reverse the motor while it is in motion.

The audio output section of the *MF-300* consists of a triode amplifier and separate cathode follower stage for each channel. The low output impedance of the cathode follower permits cable lengths up to 25 feet without any increase in distortion.

The power supply consists of a transformer with low flux density and a full-wave diode bridge for the B+ supply. The filaments of all RF and IF stages are protected from high frequency feedback by a special choke and capacitor in the front-end and by the extensive use of ferrite bead chokes in the IF section.

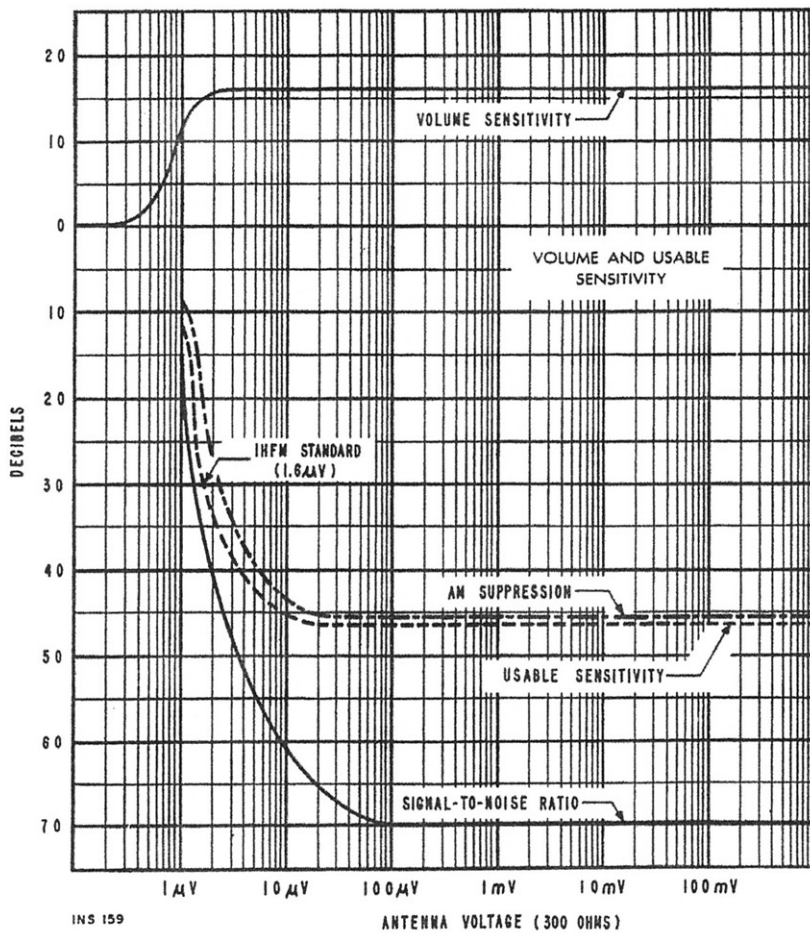


FIGURE 7. Sensitivity and signal-to-noise ratio.

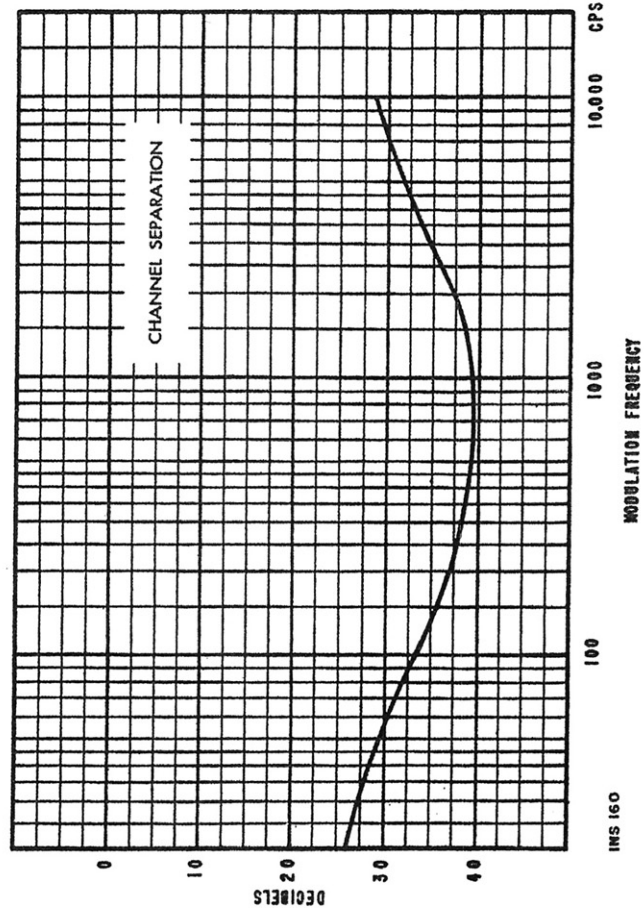


FIGURE 8. Stereo channel separation.

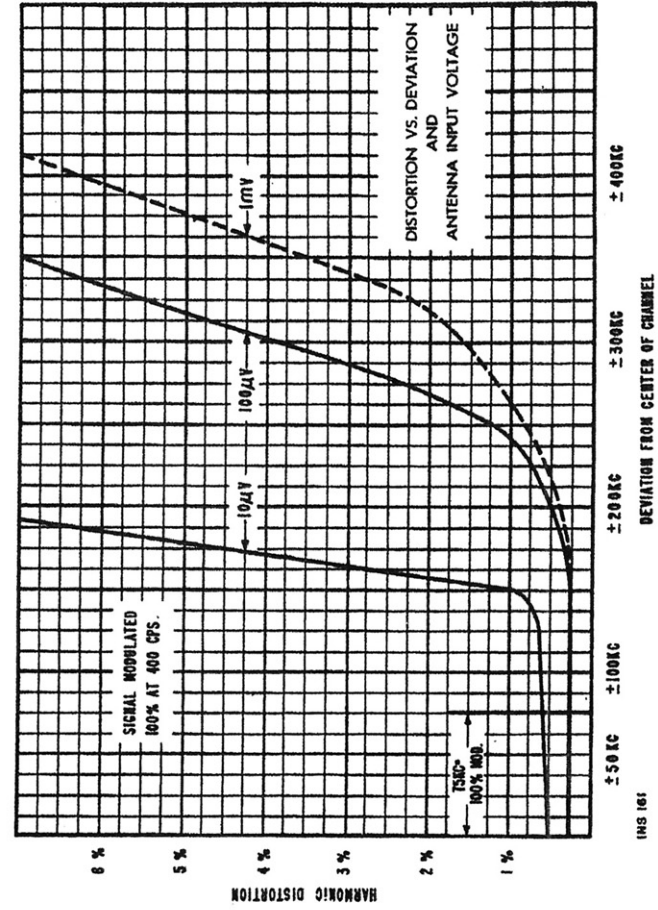


FIGURE 9. Distortion vs. deviation from center-of-channel position.

TUNE-O-MATIC Sensitivity Adjustment

The TUNE-O-MATIC sensitivity control on the rear panel has been carefully adjusted at the factory for proper operation under normal conditions. You may find, however, that in your particular location the TUNE-O-MATIC circuit does not stop at some weak (but listenable) stations, even with the Muting control at OFF. To correct this condition, simply tune manually to the desired station with the Muting control at OFF. Then slowly advance the TUNE-O-MATIC sensitivity control toward the "10" marking until the Station Indicator lights. Do not turn the control any further, since it is now properly adjusted for operation on weak stations in your area.

NOTE: The control has been painted with a special compound to prevent accidental rotation of the shaft during shipment or installation. The seal can easily be broken with a small amount of pressure.



TECHNICAL SPECIFICATIONS

Sensitivity (20 db of quieting)	
With 72-ohm antenna	0.5 microvolt
With 300-ohm antenna	1 microvolt
Usable Sensitivity (IHFM standard)	1.6 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	1.5 db
Calibration Accuracy	0.2%
Maximum Drift (without AFC)	0.02%
Audio Frequency Response	20-15,000 cps \pm 1 db
Stereo Separation (at 1 kc)	35 db
Rated Output	2 volts
Output Impedance	100 ohms
Total Audio Harmonic Distortion (at rated output)	Less than 0.15%
Audio Hum (below rated output)	More than 76 db
Power Consumption (at 105-120 volts, 50/60 cps)	58 watts

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.



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FISHER RADIO CORPORATION

21-21 44th Drive

Long Island City 1, N. Y.

