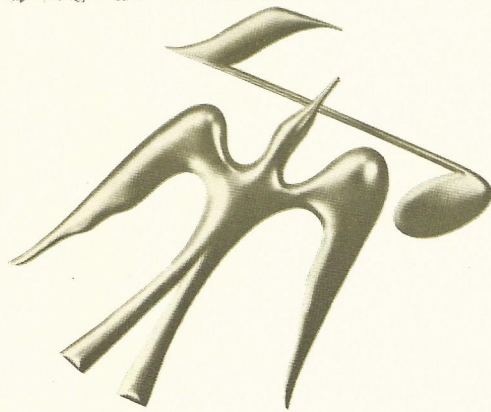


OPERATING INSTRUCTIONS AND WARRANTY



THE FISHER[®]

TFM-1000
FM-Stereo Tuner
and

FMR-2
Professional FM-Stereo
Broadcast Tuner

WORLD LEADER IN
STEREOPHONIC 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-seven 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.
- 1962 First simplified-operation Control-Amplifier, with infrequently used controls behind a 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.
- 1964 First multiplex adaptor with 'flywheel synchronization.' Closely approaches theoretical limit of noise rejection, and of all spurious responses.
- 1964 First AFC with strong locking on weak signals, with no pull-in from adjacent strong signals.

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The FISHER TFM-1000 — and its rack-mount counterpart, the FMR-2 — represent the culmination of engineering efforts to produce the ultimate in professional FM-stereo tuners. Both tuners have been designed to achieve a degree of perfection hitherto considered impossible, and to exceed the most exacting requirements for “off-the air” program monitoring and recording. In addition to the superior performance demanded by the professional user, each tuner contains a full complement of studio-type controls and indicators — plus all the convenience features which have been acclaimed by audio hobbyists and music lovers.

Most important of all, however, is the craftsmanship and the painstaking care which go into each FISHER unit. You can be sure that your tuner has been thoroughly tested, aligned, and calibrated, and has met stringent laboratory standards in each particular before leaving the factory. These efforts are responsible for the less heralded virtues of the tuner that you have just purchased; they will assure years of trouble-free operation and the highest reliability.

A final word — this FISHER tuner, like any precision electronic instrument, will deliver its full capabilities only when permitted to do so by the user. For this reason, we urge you to read this manual carefully *before* attempting to install and operate the tuner. If you simply can't wait or if you have had previous experience with other high-fidelity components and feel that you don't need elaborate instructions, please read the section entitled *FOR THE MAN IN A HURRY* — it's vitally important.

FOR THE MAN IN A HURRY

Of course you are anxious to play your new Fisher tuner. It certainly is an exciting product. But don't let your enthusiasm make you lose sight of the fact that this tuner is a complex mechanism which requires a certain amount of care during installation and operation. Please observe due caution and make sure you understand our instructions before putting the tuner in operation. The procedure we present on page 2 by no means takes advantage of the full potential of this extraordinary new tuner. All that it is intended to do is get the set in operation quickly. We do recommend that you read the rest of the manual as soon as possible.

- 1 Before you do anything else, look at the markings on the rear panel of the tuner, directly above the power cord. They indicate the AC voltage range for which your unit was wired. Make certain that the electrical power in your home is 50-60 Hz (cps) AC (*not* DC) and that its voltage lies within the range marked on the tuner. In the rare event that it does not, have your dealer or a qualified technician make the necessary wiring change as described in the *MAINTENANCE* section of this manual. If you are not sure about the type of power in your home or about the operating range of your tuner, consult your local utilities company or dealer. Do not connect the power cord to an electrical outlet or turn on the tuner yet.

- 2 Place the tuner (TFM-1000 only) on any conveniently located shelf or table that is away from radiators, warm-air ducts or other sources of heat; the shelf should be deep enough to permit at least 2 inches clearance behind the tuner chassis for ventilation. Never place the unit on a soft or yielding surface; this could impede ventilation through the underside of the chassis.

For enhanced appearance, the TFM-1000 may be installed in the FISHER Model 100-U component cabinet; this attractive walnut enclosure is available at your dealer. While the chassis may be inserted in the cabinet at any time, this procedure is simplest when performed before any connections have been made to the tuner. For information on installing the tuner in your own custom cabinet or console, refer to the *CUSTOM INSTALLATION* section of this manual; do not attempt such installations without first reading that section.

CAUTION: The professional version of the TFM-1000, the FMR-2, is intended primarily for installation in standard 19-inch-wide equipment racks. In the rare event that you install the FMR-2 at home (as outlined in the preceding paragraphs) raise the tuner chassis from the mounting shelf with two 12-inch cleats cut from a piece

of 3/4-inch square wood stock. FAILURE TO OBSERVE THIS PRECAUTION WILL VOID ALL WARRANTIES ON THIS UNIT. Refer to the *CUSTOM INSTALLATION* section for rack-mounting instructions.

- 3 Connect the twin-lead antenna supplied to the 300 OHM terminals as shown in Figure 1a. Make sure that the ANTENNAS SELECTOR switch is in the 300 OHM position. The final antenna installation should be made *after* reading the paragraphs entitled *ANTENNAS* in the *INPUTS AND OUTPUTS CONNECTION* section.
- 4 Connect a pair of shielded audio cables from the MAIN outputs to the tuner inputs of your stereo control amplifier. Naturally, your amplifier should be properly connected to a pair of loudspeakers.
- 5 Plug the tuner power cord into one of the switched convenience outlets on your amplifier. Check to make sure that your amplifier power switch is OFF and volume minimum.
- 6 Initially, make sure that the tuner's controls and switches are set as shown in Figure 1b; the AUTO pushbutton on the MODE SELECTOR should be pushed in.
- 7 Turn the tuner POWER switch ON.
- 8 Advance the OUTPUT LEVEL (DB) control to its MAX position.
- 9 Turn the amplifier power switch ON and advance the volume control to a comfortable listening level.
- 10 Tune in an FM station with the TUNING control.
- 11 Now sit back and enjoy incomparable sound. Don't forget to read the rest of the manual.

NOTE: Figure 1a also shows where to connect a tape recorder, stereo headphones, or for professional installations, the 600-ohm line output. The professional will probably also use the 72-ohm antenna input shown.

INPUT AND OUTPUT CONNECTIONS

ANTENNAS

The twin-lead antenna supplied with this unit is suitable for good reception from most local, or moderately remote FM-broadcast stations. To receive stations that are much further away, and particularly when the receiver is inside a steel-reinforced concrete building, an outdoor antenna is a necessity. Some increase in reception is possible by coupling to a nearby TV antenna—however, if a long connecting lead is required it may not give a noticeable improvement in reception.

Roof-top antennas are available for FM reception which are omnidirectional and should therefore give you improved reception from almost all stations. The TV-type antennas will improve reception—but only in one direction, that of the TV stations to which they are pointed. To receive stations in different locations, a rotatable directional antenna can be used to obtain maximum signal strength and minimum distortion—multipath distortion caused by reflections that are similar to TV ghosts. Generally, best reception will always be obtained

with an antenna system that is as high as possible—with a lead-in that is as short as possible.

You can connect a 72-ohm coaxial antenna lead-in or the more usual 300-ohm lead-in to the tuner. Connectors for either option are provided on the rear panel of the chassis. The ANTENNAS SELECTOR switch sets the proper impedance and selects the particular antenna lead-in to be used. DO NOT connect a 72-ohm antenna lead-in to the screw terminals of the 300 OHM lead-in connector. Weak-signal reception will be seriously degraded if you do.

If you use *shielded* 300-ohm cable, the screw just below the 300 OHM lead-in terminal strip should be used as the ground connection for the outer shield.

While pressing the CLEAR SIGNAL pushbutton, orient the antenna for the highest reading on the tuning meter with the least flickering of the CLEAR SIGNAL indicator. In some locations, it will be possible to get a steady indication on the CLEAR SIGNAL indicator from more than one direction. In that case use the antenna direction that gives the highest reading on the tuning meter.

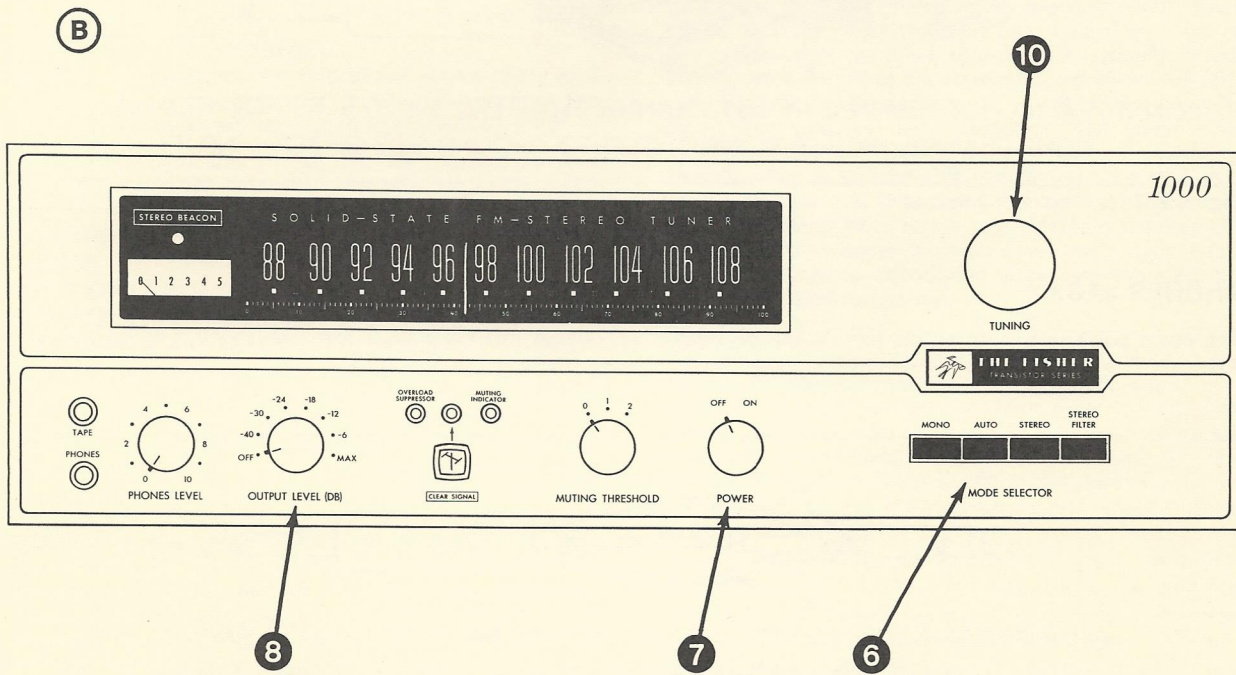
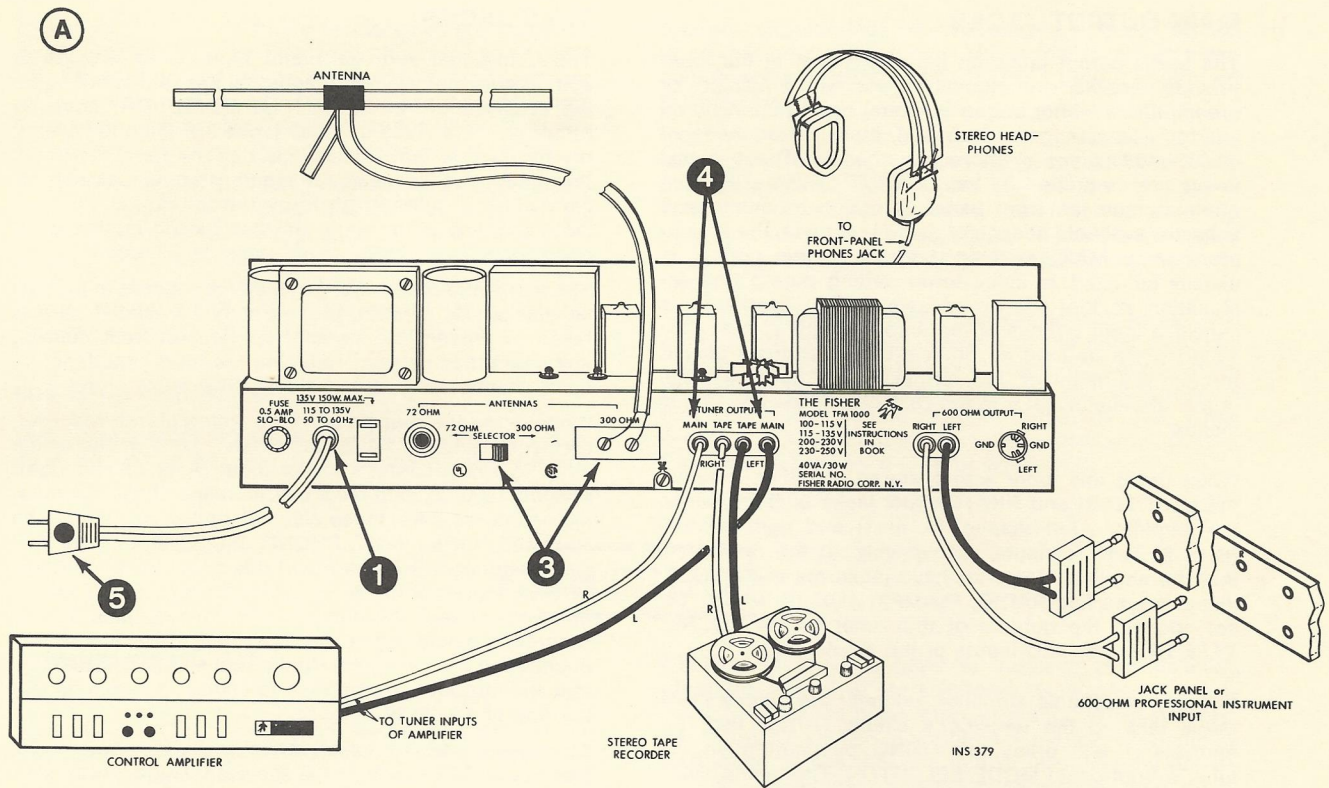


Figure 1. Installing and Operating the Tuner

MAIN OUTPUT JACKS

The MAIN output jacks on the rear panel of the tuner provide variable-level signals for use with amplifiers or preamplifiers (either stereo or mono) having unbalanced inputs (one side grounded) and input impedances of 40,000 (40K) ohms or more per channel. These signal levels are controlled by the OUTPUT LEVEL (DB) step attenuator on the front panel. Although as much as 2 volts are available at each of these jacks with the attenuator set to MAX (extreme clockwise), this control is usually adjusted to some lower setting during final installation so that FM broadcasts do not overload the sensitive input circuits of the amplifier and so that they sound about as loud as other program sources played through the amplifier. For further details about the use of this attenuator, refer to the CONTROLS section of this manual.

When using this tuner with a stereo amplifier, connect the LEFT MAIN and RIGHT MAIN jacks of the tuner to the amplifier's left-channel (A or 1) and right-channel (B or 2) TUNER inputs, respectively. In the rare event that the amplifier does not have jacks marked TUNER, use jacks marked RADIO, FM-MPX, AUX, or SPARE. Do not connect the outputs of this tuner to the PHONO, TAPE HEAD, or MIC inputs of the amplifier.

With a monophonic amplifier, connect the tuner's LEFT MAIN jack to the amplifier's single TUNER jack (or equivalent) and press the MONO pushbutton on the tuner's front-panel MODE SELECTOR. This will provide complete blended mono reproduction of all FM broadcasts.

TAPE JACKS

The front-panel and rear-panel TAPE jacks provide 2-volt outputs that are not affected by the settings of either the PHONES LEVEL or OUTPUT LEVEL (DB) controls. Although the signals at these jacks are intended primarily for making tape recordings directly from the tuner, they may also be used for feeding monitor amplifiers, crystal earphones, high-impedance level-indicating meters or any other audio devices having input impedances of at least 40,000 (40K) ohms per channel.

The front- and rear-panel jacks are connected in parallel so that either, or both, outputs may be used if care is taken to prevent the parallel connection from causing any interaction or from reducing the total impedance in each channel to a value below 40,000 (40K) ohms.

When using the rear-panel jacks with a stereo recorder, connect the LEFT TAPE and RIGHT TAPE jacks of the tuner to the recorder's left-channel (A or 1) and right-channel (B or 2) high-level inputs, respectively. Depending on the recorder, these types of inputs may be marked HI-LEVEL, LINE INPUT, PHONO, P.U. GRAM or the like. Do not connect the outputs of this tuner to the MICROPHONE inputs of the recorder. If the recorder is monophonic, connect the tuner's LEFT TAPE jack to the recorder's single high-level input and press the MONO pushbutton on the tuner's front-panel MODE SELECTOR; this will produce a complete, blended monophonic recording of all FM broadcasts.

To connect a tape recorder or other audio device to the front-panel TAPE jack, use a standard 1/4-inch three-pole phone plug. Connect the shielded cables from the external device to the plug as shown in Figure 2.

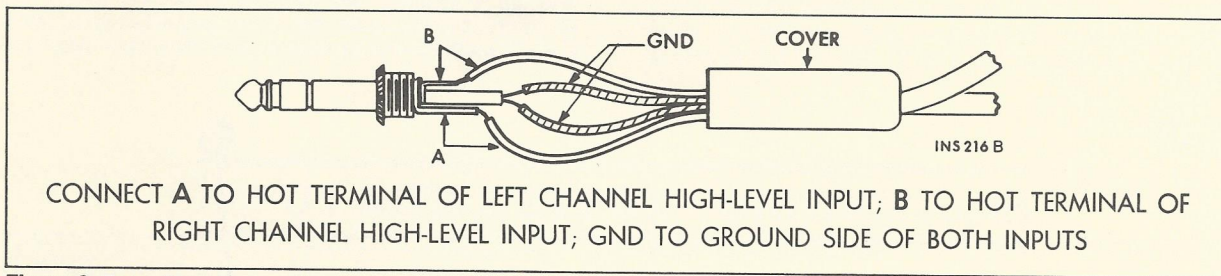


Figure 2. Tape Plug Connections

PHONES JACK

The audio power available at this jack is approximately 500 mW. The PHONES LEVEL control, adjacent to the

PHONES jack on the front panel, is used to adjust the output level to 4-, 8-, 16-ohm, or even higher-impedance stereo headphones or low-level monitor speakers connected to the PHONES jack.

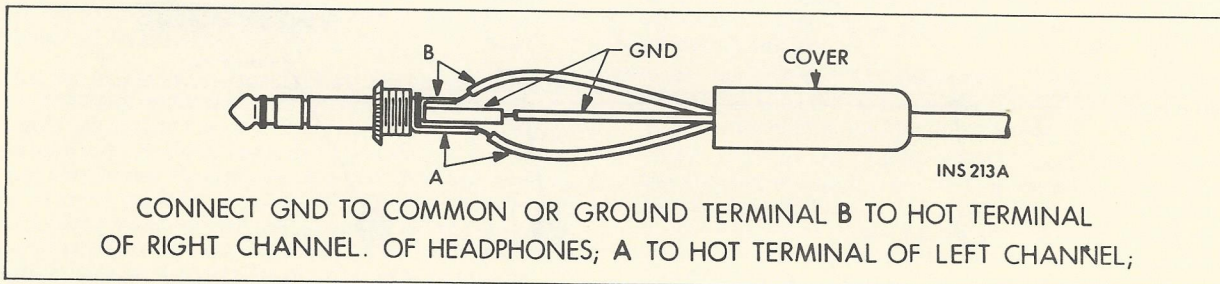


Figure 3. Headphone Plug Connections

Almost all commercial stereo headphones are equipped with the proper type of plug to fit this jack. In the rare event that yours are not, or if you want to connect your own low level monitor speakers, use a standard 1/4-inch three-pole phone plug; connect the cables from the phones or speakers to the plug as shown in Figure 3.

NOTE: The PHONES LEVEL control also adjusts the 600-ohm output level. Using this control to adjust the listening level of the headphones or low-level monitor speakers will also change the signal level to any instrument connected to the 600-OHM OUTPUT jacks. The signals at the MAIN and TAPE output jacks are not affected by the PHONES LEVEL control.

600-OHM OUTPUTS

Two standard RETMA jacks and a five-terminal Hirschmann socket on the rear panel of the chassis provide

floating (ungrounded) 600-ohm stereo outputs for use in professional installations. The signal levels at these outputs are controlled by the PHONES LEVEL control on the front panel.

Each RETMA jack is connected in parallel with two terminals of the Hirschmann socket, providing two outputs per channel; both outputs may be used simultaneously, if desired. For example, the Hirschmann socket may be used to drive the inputs of a stereo bridging amplifier while each RETMA jack feeds an output or VU meter.

The shell of the Hirschmann socket as well as its GND terminal are connected internally to the tuner's chassis ground and may be used as convenient ground points to suit your particular wiring requirements. They are *not* electrically part of the 600-ohm output circuits. When ordering a five-pin plug to fit this socket, specify a Hirschmann type MAS-50-S or equivalent.

CONTROLS

POWER, OFF—ON

This switch turns the instrument ON or OFF. The AC receptacle on the rear-chassis apron however, is not controlled by the POWER switch. Any device plugged into the receptacle must be turned ON or OFF separately with its own switch.

MODE SELECTOR

These four interlocked pushbuttons select the output mode of operation. When you press in one pushbutton, any previously pressed pushbutton will pop out. DO NOT attempt to press more than one button at a time; it will not accomplish anything.

MONO—This pushbutton is pressed when the signal received is not steady enough for stereo reception. The automatic circuits will be locked in the MONO mode.

AUTO—Normally this button will be pressed since it should be used for almost all reception. When the AUTO button is pressed in, the automatic circuits will switch from stereo to mono and back again depending on whether stereophonic or monophonic broadcasts are being received.

STEREO—When this pushbutton is pressed only stereophonic broadcasts will be heard. All monophonic broadcasts will be muted automatically even when the MUTING THRESHOLD is set to the "0" position. The STEREO and MUTING THRESHOLD do not duplicate the muting function. The MUTING THRESHOLD works with the signal strength of the received broadcast stations while the STEREO button selects between stereophonic and monophonic broadcasts. For example, with the MUTING THRESHOLD set to position "2" and the STEREO pushbutton pressed, only strong-signal stations broadcasting stereophonic programs will be heard. Between-station noise, noisy or fading stations, and stations broadcasting monophonic programs will not be heard. If the MUTING THRESHOLD is set to the 0 position, all stations broadcasting stereophonic programs will be heard even when their signal is not strong enough or steady enough to give listening pleasure.

STEREO FILTER—is used to increase your listening pleasure when the stereophonic broadcast contains some background noise (hiss or static). When pressed, the STEREO FILTER position will reduce or eliminate distracting noises that are due to less-than-perfect reception or technical problems in the broadcasting equipment. Except for the added noise-elimination feature the operation of the STEREO FILTER button is the same as the functions of the STEREO pushbutton.

TUNING

To select an FM station, turn this control *slowly* and watch the lighted pointer behind the dial glass. You'll notice that there are actually *two* scales on the dial glass; the large numbers represent the actual broadcasting frequencies of the stations in the 88- to 108-MHz (Mc) FM-broadcast band. (Stations will be listed in your local newspaper by these numbers.) The small scale (called a logging scale) consists of just pure numbers ranging from 0 through 100. Once you've tuned to a station for the first time using the conventional scale, you can make a note of the logging-scale number and retune to that number the next time. Many people find this method more convenient than remembering the exact broadcast frequency.

Regardless of which scale you use, accurate tuning is essential for clear, undistorted reception (and, in the case of FM-stereo broadcasts, for maximum stereo separation). To reach the point of best reception for each station (called "center of channel"), *always tune for the maximum tuning-meter indication obtainable for that station.* The *actual value* of the meter reading will depend greatly on the relative distance and signal strength of the station.

If the front-panel MODE SELECTOR is set for AUTO, STEREO, or STEREO FILTER operation, the STEREO BEACON lamp behind the dial glass will light whenever you come to a station broadcasting in stereo. The lamp should remain lighted so long as the station you're listening to keeps broadcasting in stereo. If the light starts to blink on and off or if the program sounds noisy or distorted in *all* stereo modes, this is an indication that

the signal is too weak or marred by too many reception problems to be reliable or pleasing. In this case, push the MONO pushbutton on the MODE SELECTOR; the blinking, noise and distortion will stop and you can listen to the program monophonically. For details about using the MUTING THRESHOLD control and CLEAR SIGNAL indicator to obtain improved reception, refer to subsequent paragraphs in this section.

MUTING THRESHOLD

This 3-position selector provides two muting threshold levels plus an off position. In the two muting positions (1 or 2) the MUTING INDICATOR glows.

0 — is the off position. In this position normal between-station noise will be heard as you tune up and down the FM band.

1 — is the minimum muting position. All between-station noise is silenced and all stations, except for the very weakest ones, are heard. The output is silenced only between stations.

2 — is the maximum muting position. Only stations that are strong enough to give good stereo reception are heard. Weak-signal stations may be muted.

NOTE: When using either position 1 or 2 of this switch, always turn the TUNING control *slowly* and watch the tuning-meter indications closely; this will minimize the chances of your inadvertently passing by some weaker stations that you might want to hear.

PHONES LEVEL

This control is located near the PHONES jack at the left side of the front panel. It controls the output level at the PHONES jack as well as at both 600 OHM output connectors on the rear-chassis apron.

OUTPUT LEVEL (DB)*

This eight-position step attenuator controls the output-signal levels at the rear-panel MAIN jacks. Usually, it need be adjusted only once (during the final phases of installation) so that the volume levels of FM broadcasts sound about equal to those of other program sources played through the same amplifier without it being necessary for you to readjust the amplifier's Volume control each time you switch between these sources. The same adjustment will also minimize the chances of excessively strong tuner signals overloading the amplifier's tuner-input circuits and causing distortion. This simple adjustment may be performed as follows:

(1) With the tuner installed and operating as described in the section *FOR THE MAN IN A HURRY*, switch the amplifier into *mono* operation.

(2) Switch the amplifier's Input Selector to Phono or Tape and play a record or tape recording; adjust amplifier volume for a comfortable listening level.

(3) While switching the amplifier's Input Selector back and forth between Phono (or Tape) and Tuner, listen to the volume level of FM broadcasts as compared with the recording or tape; *do not touch the amplifier's volume control*. Adjust the tuner's OUTPUT LEVEL (DB) attenuator until the FM broadcasts sound about as loud as the other program source. Leave the attenuator set at its present position; all further volume adjustments should now be made only at the amplifier.

***NOTE:** The various intermediate positions of this attenuator are calibrated in values of db (decibels); these units of measurement are the engineer's shorthand method of expressing the magnitude of a signal as compared with a reference signal having a fixed magnitude or level. In this particular case, they represent the various output-signal levels that can be selected as compared with the maximum signal available with the attenuator set to MAX (approximately 2 volts). For example —6 corresponds to a signal level 6 db lower than maximum (approximately 1 volt), —12 to a signal 12 db lower (approximately 0.5 volt), —18 to a signal 18 db lower (approximately 0.25 volt), and so on. With the attenuator set to OFF, the MAIN jacks are shorted to ground and there is no tuner output at all.

OVERLOAD SUPPRESSOR

Whenever this lamp lights, this is an indication that the automatic overload-suppressor circuits in the tuner are in operation because the FM-broadcast signal that you are receiving is abnormally strong. A conventional FM tuner could be overloaded by a signal of this magnitude, causing the broadcast to be heard at more than one point on the dial (unless special steps are taken to attenuate the signal from the antenna). This, of course, would reduce the sensitivity of the tuner and consequently reduces its ability to pull in weak stations. However, your advanced Fisher tuner automatically adjusts itself for optimum reception of both strong and weak signals.

CLEAR SIGNAL

Pressing this pushbutton will cause the indicator lamp just above the pushbutton to light. A clear, steady light will indicate a clear, steady broadcast signal. Weak or fading signals that occur during multipath reception will cause the indicator to become dim or flicker. A rotating antenna can be positioned by watching the indicator — set the antenna for a steady light. If the light indicates a CLEAR SIGNAL from more than one direction it is best to use the position that gives the highest reading on the tuning meter.

CUSTOM INSTALLATION

NOTE: The following instructions apply only to the TFM-1000. For information on installing the FMR-2, proceed to the paragraph entitled RACK MOUNTING THE FMR-2.

The TFM-1000 may be installed in a custom cabinet or enclosure of your own choice provided that you follow the general precautions and detailed installation instructions included in this section. Remember that heat is the greatest enemy of electronic equipment; heat from a nearby component or a radiator could be great enough to degrade the performance of the tuner or cause premature parts failure. For this reason, as well as for the sake of electrical and mechanical safety, it is absolutely essential that you observe the following precautions:

(1) Do not place the custom cabinet near a radiator, warm-air duct or other source of heat. To permit cooling air to circulate around and *through* the tuner chassis, keep the rear of the cabinet open and at least a few inches away from a wall or other obstruction; also, raise the tuner chassis from the mounting shelf with wooden cleats (as specified in the installation instructions that follow). If another heat-producing component, such as an amplifier, is installed in the same cabinet, mount it *above* the tuner. In any event, the ambient air temperature in the area of the tuner chassis should not exceed 40° Centigrade or 104° Fahrenheit.

(2) *Before* installing the tuner, unscrew the four plastic feet from its bottom cover, but keep them for reuse in case you decided to remove the tuner from the cabinet and place it on an open shelf or table at some later date. These feet *must* be re-installed in such cases.

(3) You will need two flat-head wood screws to fasten the cleats to the mounting shelf in your custom cabinet. Depending on the thickness of the mounting shelf, you will also need four 1½-inch or 1¾-inch 8-32 machine screws with washers to fasten the tuner chassis to the cleats and mounting shelf; these items are available at any hardware store. In any event, the machine screws must not protrude more than ¼ inch above the cleats; greater lengths may damage delicate parts or cause short circuits inside the tuner chassis. *Before* installing the tuner, compare the length of a sample screw with the combined thickness of the mounting shelf and one of the ¾-inch cleats to make sure that the screw meets this requirement; use the washers, if necessary, to take up any excess length.

NOTE: If you intend to install the tuner vertically, you will need at least 14 No. 8, 1¼-inch round-head wood screws in addition to the hardware mentioned above.

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

HORIZONTAL INSTALLATION (TFM-1000 ONLY)

(1) Figure 4a is an overall view of the completed horizontal installation, showing the relationship of the custom cabinet, tuner chassis, mounting shelf, and cleats. Study it carefully so that you get a clear idea of the general requirements of the installation.

(2) Figure 4b is a top view of the installation, showing optional vent holes (represented by shaded areas) in the mounting shelf that provide additional ventilation to the underside of the tuner chassis. If you choose to use them, measure the locations and dimensions of vent holes 2 and 3 *only* and saw them out.

(3) Cut two cleats 12 inches long from a piece of ¾-inch square wood stock.

(4) Fasten the cleats to the mounting shelf with the two flat-head wood screws at the points marked A in Figure 4b. If possible, insert the screws from the underside of the mounting shelf; if you must drive the screws from above, make certain that the screw heads are counter-sunk below the top surfaces of the cleats.

(5) Locate and drill four 5/16-inch holes as shown at the points marked B in Figure 4b.

(6) Saw a cutout through the front panel of your custom cabinet to the dimensions shown in Figure 4c. Make certain that the bottom edge of the cutout is the same height above the mounting shelf as the tops of the cleats.

(7) Make sure that the plastic feet have been removed from the tuner. Slide the tuner chassis into the custom-cabinet cutout until the tuner's front panel is tight against the cabinet's front panel and hides the rough edges of the cutout.

(8) Insert the four appropriately-sized machine screws (with washers, if necessary) into the holes on the underside of the mounting shelf and fasten the tuner chassis into place. Make certain that the screws do not penetrate more than ¼-inch into the chassis.

VERTICAL INSTALLATION (TFM-1000 ONLY)

CAUTION: Do not attempt to install this tuner vertically unless you use an open-back cabinet and install the chassis exactly as specified in the following instructions. OUR WARRANTY DOES NOT COVER DAMAGE CAUSED BY EXCESSIVE HEAT BUILD-UP.

(1) Figure 5a is an overall view of the completed vertical installation, showing the relationship of the custom cabinet, tuner chassis, mounting board and cleats. Study it carefully so that you get a clear idea of the general requirements of the installation.

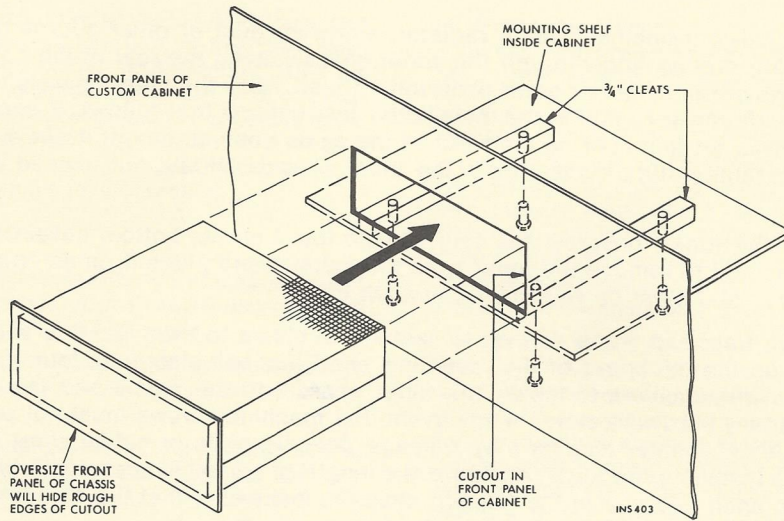
Measure the inside height of the cabinet and compare this height with the overall depth (front panel to fuse post) of the tuner chassis; the cabinet must be high enough to provide *at least* the 4-inch clearance shown between the chassis and the bottom of the cabinet.

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

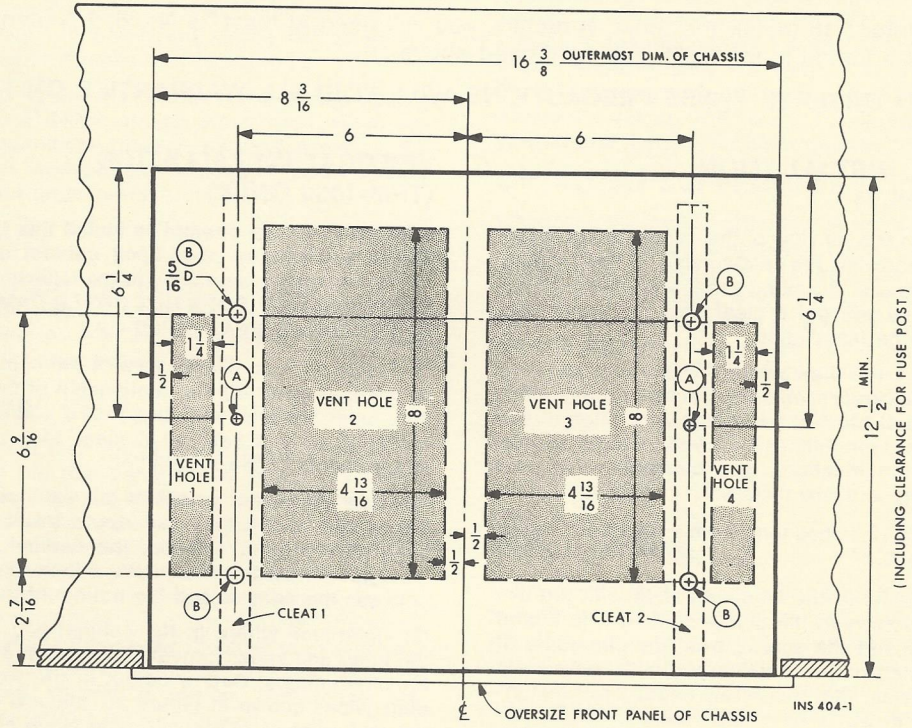
(3) Measure the inside width of the cabinet (or mounting compartment) as shown in Figure 5b. Cut a chassis-mounting board from ¾-inch plywood so that it is ¼-inch narrower than the inside width of the cabinet; this will provide the necessary 1/8-inch clearance at each edge as shown. The other dimension of the board should be an inch or two greater than the overall depth (front panel to fuse post) of the tuner chassis.

(4) Hold the mounting board horizontally so that it is flat against the underside of the cabinet's top panel. Position the board so that it clears each side wall of the cabinet (or mounting compartment) by the required 1/8-inch. Extend the pencil mark at the edge of the cutout across the exposed part of the mounting board. Using this pencil mark as one of the necessary references, lay out the locations and dimensions of vent holes 2 and

A



B



C

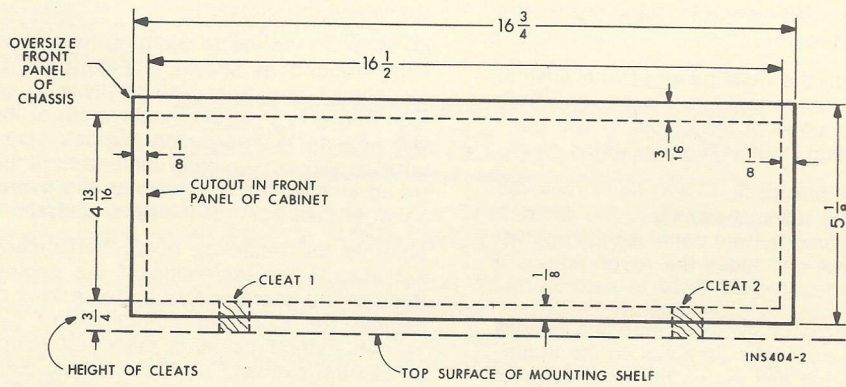


Figure 4. Horizontal Installation

3 only (shown in Figure 4b) and saw them out. **These holes are mandatory for vertical installation.**

(5) Cut two cleats 12 inches long (cleats 1 and 2) from a piece of $\frac{3}{4}$ -inch square wood stock. Lay out the locations of the cleats on the mounting board as shown in Figure 4b. Fasten the cleats to the board with the two flat-head wood screws at the points marked A in the illustration. If you drive the screws through the cleats from above, make sure that the screw heads are countersunk below the top surfaces of the cleats.

(6) Locate and drill four $\frac{5}{16}$ -inch holes through the cleats and board as shown at the points marked B in Figure 4b.

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

(8) Cut two cleats $12\frac{7}{8}$ inches long (cleats 3 and 4) from a piece of 1-inch square wood stock. Drill four $\frac{3}{16}$ -inch pilot holes, spaced about four inches apart, through cleat 3. Turn the cleat 90 degrees and drill three more $\frac{3}{16}$ -inch holes; space the holes about four inches apart so that each hole is about midway between any two holes that are at right angles to it. Repeat this procedure for cleat 4.

(9) Hold cleat 3 at its appropriately marked location on one of the inside side walls of the cabinet (or mounting compartment). Make sure that the cleat is perpendicular to the top panel and about $\frac{1}{2}$ inch below it. Using the three $\frac{3}{16}$ -inch holes as guides, locate and drill three $\frac{1}{16}$ -inch pilot holes in the side wall of the cabinet, about $\frac{1}{4}$ inch deep. Repeat this procedure with cleat 4. Mount both cleats inside the cabinet with six No. 8, $1\frac{1}{4}$ -inch round-head wood screws.

(10) Make sure that the plastic feet have been removed from the tuner. Gently remove the tuner's control knobs and the hex nuts (on the control-shaft bushings) that hold the front panel to the rest of the tuner chassis; lift off the front panel.

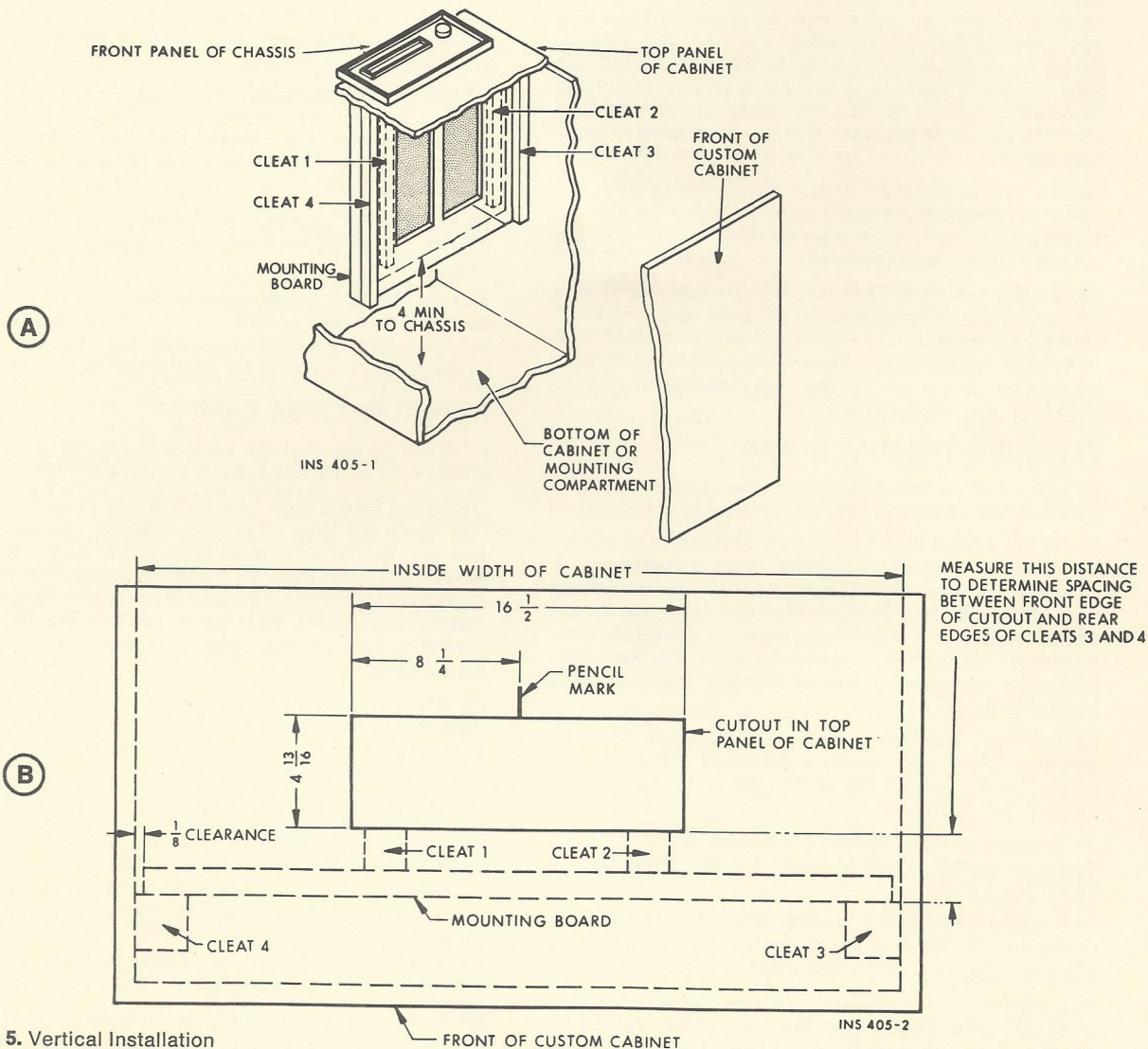


Figure 5. Vertical Installation

(11) Insert four 1³/₄-inch 8-32 machine screws (with washers, if necessary) into the holes on the underside of the mounting board and fasten the tuner chassis into place. Remember, make certain that the screws do not penetrate more than 1/4 inch into the chassis.

(12) Fasten the mounting board to cleats 3 and 4 using eight No. 8, 1¹/₄-inch round-head wood screws; support the mounting board while doing this and make sure that the top edge of the board is tight against the underside of the cabinets' top panel. Replace the tuner's front panel, hex nuts and control knobs.

RACK MOUNTING THE FMR-2

Since the FMR-2 has a built-in cradle-type mounting bracket, it is a simple matter to install the tuner chassis

in a standard 19-inch-wide equipment rack, whether the rack has slide-type supports or is of the newer front-panel-mount type. Proceed as follows:

(1) Make certain that the location in the rack that you have selected for the tuner is not above any heat-producing component such as an amplifier. The ambient air temperature in the area of the tuner chassis should not exceed 40° Centigrade or 104° Fahrenheit.

(2) While supporting the tuner, make all necessary electrical connections on its rear panel.

(3) Push the tuner chassis all the way into the rack and fasten the tuner's front panel to the rack with four appropriately sized machine screws. If the rack provides support at the front panel only, support the tuner chassis until its front panel is fastened securely to the rack.

MAINTENANCE

CLEANING THE FRONT PANEL

The beautiful gold plating on the TFM-1000 control-panel borders will retain its color and brilliance permanently. However, it is possible that, over a period of time, a film from atmospheric contamination may dull the surface. Simply use a soft *freshly-laundered* cloth dampened with *plain lukewarm water* to wipe it clean and the panel will look new again. **Do not use any household or industrial cleaning agents or any cloth that has been used to apply such agents.**

Should you damage the insert panels inside the gold borders, replacements are available. These panels are held in place by pressure-sensitive adhesive and are readily removed and replaced.

NOTE: The rack-mount version of this tuner, the FMR-2, has a one-piece anodized front panel instead of the gold-plated borders and anodized inserts of the TFM-1000. However, since the materials used in finishing both types of panels are similar, the FMR-2 should be cleaned in exactly the same manner.

CLEANING THE DIAL GLASS

(1) Make certain that the tuner is turned off and that its power cord is disconnected from the electrical outlet.

(2) **On the FMR-2 only**, remove the four machine screws that fasten the tuner's front panel to the equipment rack and pull the tuner chassis part of the way out of the rack. If the rack is a front-panel-mount type, disconnect all cables from the tuner and remove the chassis completely. The tuner's front-panel handles are held from behind by four machine screws; remove the screws and the handles.

(3) Remove all control knobs from the front panel by grasping each knob in turn and pulling it towards you *gently*. Do not remove the MODE SELECTOR or CLEAR SIGNAL pushbuttons.

(4) Remove all hex nuts (on the control-shaft bushings) that hold the front panel to the rest of the tuner chassis; lift off the panel.

(5) Loosen or detach one end of each vertical foam-cushion strip; these strips are fastened to the retaining clips at either end of the dial glass.

(6) Loosen (do not remove) the screws that hold the dial-glass retaining clips; swing the clips aside and lift off the dial-glass. Because the glass is held from behind by

two adhesive rubber strips, it may be necessary to apply a gentle prying force at the ends.

(7) Remove dust with a dry rag. If you wish to clean more thoroughly, use a soap-and-water solution only; a stronger cleaning agent may damage the markings on the glass.

(8) Replace the dial glass. Make certain to reset it in its original position by placing it firmly against the *lower left-hand* corner of the plastic end frame. Swing the retaining clips back into place and tighten the retaining-clip screws.

(9) Replace the foam-cushion strips, panel, hex nuts, and control knobs by reversing the procedures in steps 3 through 5.

(10) **On the FMR-2 only**, replace the front-panel handles and their mounting screws. Place the tuner chassis back in the equipment rack (if necessary, reconnect all cables to the tuner) and fasten the front panel to the rack.

REPLACING DIAL LAMPS

(1) Make certain that the tuner is turned off and that its power cord is disconnected from the electrical outlet.

(2) **On the FMR-2 only**, remove the four machine screws that fasten the tuner's front panel to the equipment rack and pull the tuner chassis part of the way out of the rack. If the rack is a front-panel-mount type, disconnect all cables from the tuner and remove the chassis completely. The tuner's front-panel handles are held from behind by four machine screws; remove the screws and the handles.

(3) Remove all control knobs from the front panel by grasping each knob in turn and pulling it towards you *gently*. Do not remove the MODE SELECTOR or CLEAR SIGNAL pushbuttons.

(4) Remove all hex nuts (on the control-shaft bushings) that hold the front panel to the rest of the tuner chassis; lift off the panel.

(5) The dial lamps are spring-clip mounted at either end of the dial glass. To remove either lamp, gently pull it out of its clip mount. Replace it with the new dial lamp (Part Number 150441-1*), making certain that the *unpainted* side of the lamp faces *towards* the edge of the dial glass.

(6) Replace the front panel, hex nuts, and control knobs by reversing the procedures in steps 3 and 4.

(7) **On the FMR-2 only**, replace the front-panel handles and their mounting screws. Place the tuner chassis back in the equipment rack (if necessary, reconnect all cables to the tuner) and fasten the front panel to the rack.

***NOTE: Replacement lamps may be ordered from your authorized FISHER dealer or from: Parts Department, Fisher Radio Corporation, 11-40 45 Road, Long Island City, New York 11101.**

REPLACING THE TUNING-METER LAMP

The tuning-meter lamp is located under a black metal cover fastened to the top of the chassis, directly behind the tuning meter. To replace it, proceed as follows:

(1) Make certain that the tuner is turned off and that its power cord is disconnected from the electrical outlet.

(2) **On the FMR-2 only**, remove the four machine screws that fasten the tuner's front panel to the equipment rack and pull the tuner chassis part of the way out of the rack. If the rack is a front-panel-mount type, disconnect all cables from the tuner and remove the chassis completely.

(3) Remove the two Phillips-head screws that hold the metal cover to the chassis bracket; squeeze the cover gently and lift it out. The meter lamp is the *lower* of two lamps under this cover; it is bracket-mounted directly behind — and parallel to — the tuning meter. Do not confuse it with the STEREO BEACON lamp, directly above it.

(4) Remove the lamp (together with its metal shade) by pushing it into its socket and turning it *counterclockwise* until it disengages. Keep the shade for use with the replacement lamp (No. 1847-0F, an extended-life, frosted version of the standard No. 47 lamp). If your dealer cannot supply this item you may order it from us (Fisher Part No. I-50009-8*) or you may use a standard No. 47 lamp instead.

(5) Install the new lamp (with shade) by pushing it into the socket and turning it *clockwise* until it engages. Turn the shade so that the unshaded portion of the lamp faces directly towards the meter.

(6) Replace the metal cover and Phillips-head screws.

(7) **On the FMR-2 only**, place the tuner chassis back in the equipment rack (if necessary, reconnect all cables to the tuner) and fasten the front panel to the rack.

***NOTE: Replacement lamps may be ordered from: Parts Department, Fisher Radio Corporation, 11-40 45 Road, Long Island City, New York 11101.**

SERVICING OTHER LAMPS AND INDICATORS

The STEREO BEACON, OVERLOAD SUPPRESSOR, CLEAR SIGNAL, MUTING INDICATOR, and dial-pointer lamps are all long-life devices which should not require replacement in normal use. However, in the rare event that they should, do not attempt to replace them yourself; they *are not* customer-serviceable. Consult your dealer or a qualified technician for further information or service.

POWER REQUIREMENTS

This tuner is designed for use on 50- to 60-Hz (cps) AC power only. DO NOT CONNECT IT TO A DC OUTLET.

The power transformer in this unit is capable of operating on any one of four AC voltage ranges: 100-115 volts,

115-135 volts, 200-230 volts, or 230-250 volts. The specific voltage range for which *your* tuner was factory adjusted is indicated on its rear panel (directly above the power cord). If, at some later date, you move to a new locality where the AC voltage differs from that for which your tuner was originally adjusted (see above), have your dealer or a qualified technician change the power-transformer connections (inside the chassis) and the fuse rating (if necessary) as shown in Figure 6.

POWER FUSE

The AC power input of this unit is fused to protect it against abnormal power-line surges and other adverse conditions sometimes encountered by electronic equipment. If the unit suddenly becomes completely inoperative (i.e., all front-panel lamps and dial lamps go out and there is no audio output — either at the front-panel PHONES jack or at any of the rear-panel jacks — at all settings of the PHONES LEVEL and OUTPUT LEVEL (DB) controls), this is an indication that the power fuse may have blown. This fuse is in the rear-panel receptacle next to the power cord. To replace it proceed as follows:

NOTE: To gain access to the fuse receptacle on a rack-mounted FMR-2, it may be necessary to remove the four machine screws that fasten the tuner's front panel to the equipment rack and then remove the tuner chassis from the rack.

(1) Turn the tuner's POWER switch OFF and disconnect its power cord from the electrical outlet.

(2) Push the fuseholder cap into the receptacle and turn it *counterclockwise* until it disengages; extract it from the receptacle and remove the fuse from the cap.

CAUTION: Because this unit is capable of multivoltage operation, it is extremely important that you select the correct replacement fuse for the operating-voltage range of your tuner as described in either step 3 or step 4:

(3) If your tuner is still operating on the voltage range for which it was originally adjusted at the factory, use the rating printed directly above the fuse receptacle as a guide. One of the spare fuses included with the tuner will have this same rating stamped on one of its metal ends. Use only this fuse (or an exact commercial equivalent) as a replacement for the blown power fuse.

(4) If, at one time or another since you purchased it, your tuner has been readjusted for operation on a different voltage range, it may have been necessary for the technician to change the fuse value as well. Therefore, ignore the fuse rating printed directly above the fuse receptacle. Use the following guide instead:

(a) With units converted for 100- to 115-volt or 115- to 135-volt operation, use a 0.5-ampere, 125-volt slow-blow fuse as a replacement.

(b) With units converted for 200- to 230-volt or 230- to 250-volt operation, use a 0.25-ampere, 250-volt, slow-blow fuse as a replacement.

(5) Insert the correct replacement fuse into the fuse cap; push the cap and fuse into the receptacle and turn the cap *clockwise* until it engages. Plug the power cord into the electrical outlet and turn the POWER switch ON.

CAUTION: If the tuner still does not operate or if the replacement fuse blows immediately, do not attempt to replace the fuse again. Consult your dealer or a qualified technician.

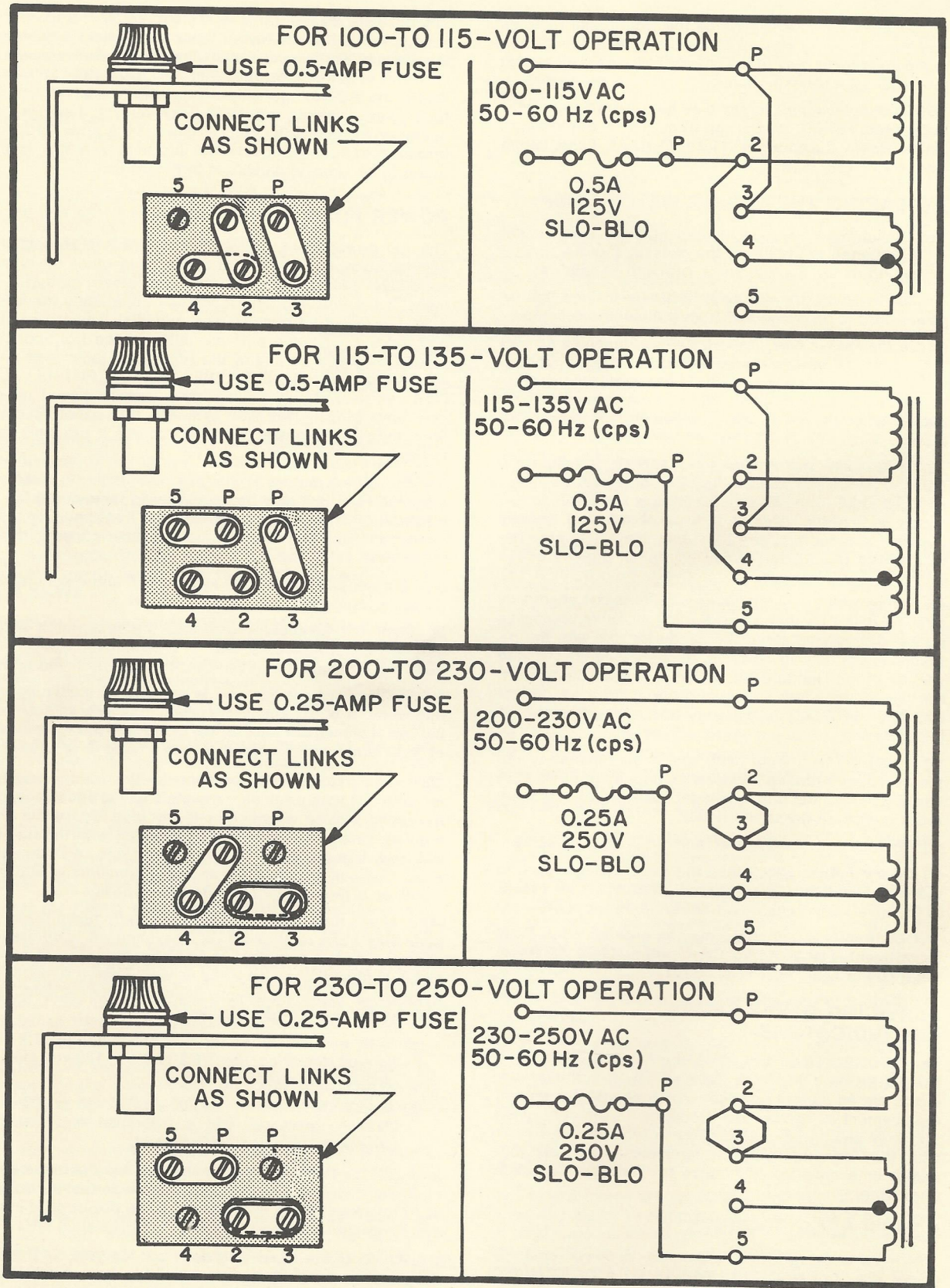


Figure 6. Multivoltage Transformer Connections

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TECHNICAL DESCRIPTION

The FISHER TFM-1000—and its rack-mount counterpart, the FMR-2—are completely transistorized, truly wide-band FM Multiplex-Stereo Broadcast Tuners, each of which includes:

- a highly selective front end with a choice of 72-ohm or 300-ohm antenna inputs, employing revolutionary silicon field-effect transistors (FET's).
- five full-bandwidth IF stages.
- three symmetrical hard-limiter stages.
- a 10-MHz (Mc) bandwidth counter-type detector.
- a time-division multiplex decoder with four-diode coincidence circuit.
- 600-ohm balanced output for professional applications.
- low-impedance output for head phones or low-level monitor speakers.
- step-attenuator-controlled output for positive preset levels.
- full-level output for remote attenuator applications.

THE FRONT END

The front end consists of three selected FET's plus one low-noise transistor combined with a precision 4-gang tuning capacitor. Unusually high gain and selectivity are achieved by six tuned circuits. Spurious response rejection is higher than 90 db and image rejection is better than 80 db. An AGC-controlled solid-state RF attenuator (a special PIN diode which acts like a variable resistor at FM frequencies) at the input of the front end circuit insures overload immunity superior to that of the best tube-type front ends. A dual shield, encasing the entire front end, minimizes local-oscillator radiation and exclude powerful signals from nearby transmitters.

IF SECTION

The five full-bandwidth IF stages are preceded by an AGC-controlled wide-band amplifier that has a 60-db attenuation range. This (together with the AGC-controlled PIN-diode attenuator, connected between the antenna and the front end) ensures complete overload protection for the front end and IF amplifier over a 120-db input-signal range. Since this attenuator is not tuned, there can be no IF detuning effects, even at maximum attenuation.

The IF transformers are phase and amplitude compensated to achieve unprecedented low distortion and optimum capture ratio. In addition, the steep slopes of the IF amplifier response ensure high selectivity.

LIMITER AND DETECTOR STAGES

The circuits of the limiter and detector are a major departure from commonly-used circuits. There are no tuned circuits which means that drift and alignment problems are eliminated. A completely new principle, using a delay line, insures an extremely linear bandwidth of more than 10 MHz (Mc) and the lowest-possible distortion of the main and subcarrier channels.

The three-stage hard limiter provides a constant-level input to the detector. There are no time constants—without a capacitor to charge and discharge there is complete clipping of even the shortest transient-interference waveforms. Since the limiters are symmetrical, transient pulses and other forms of amplitude modulation

cannot be converted into phase or frequency modulation in the limiter circuits. With the bandwidth of the limiter stage exceeding 6 MHz (Mc) the theoretical capture ratio of 0.6 db is fully assured.

To prevent harmonics of the 10.7-MHz (Mc) IF signal from being radiated, the three-stage limiter and the counter-type detector are housed in a completely shielded subchassis. A printed-circuit board insures uniformity of wiring in this critical stage. There are no tuned circuits in this subassembly so that it cannot be out of alignment. Recent advances in semi-conductor development have made the counter-type detector possible. With a linear bandwidth in excess of 10 MHz (Mc), and with long-term stability, an over-all capture ratio of 0.6 db is easily achieved and distortion is not measurable even with modulation frequencies as high as 53 kHz (kc) encountered in multiplex reception.

MULTIPLEX DECODER

An extremely effective SCA suppression filter is incorporated into the multiplex decoder circuits. This filter is phase compensated to give maximum stereo separation at even the highest audio frequencies. The time-division multiplex decoder also contains a circuit for automatic stereo-mono switching as well as a circuit for actuating the STEREO BEACON indicator. The linear phase characteristics of the multiplex decoder ensure better than 40 db stereo separation at mid-range frequencies and over 30 db at 15 kHz (kc).

This completely new circuit is the result of many years of multiplex-circuit design experience. A 19-kHz (kc) high-gain, extremely-selective amplifier precedes a dual-diode "hard" limiter (similar to that used in the IF limiter) which removes unwanted AM components from the wanted signal. A double-tuned 38-kHz (kc) filter removes all traces of the 19-kHz (kc) signal. To prevent false triggering of the automatic stereo-mono switching and indicator circuits, a special four-diode coincidence circuit was developed—the correct signals must be received from four sources before the automatic circuits will make the change from mono to stereo operation.

MUTING

The muting circuits will prevent between-station noise from being heard except when they are switched OFF or when all four MODE SELECTOR pushbuttons are out. Extremely weak signals will still be heard even if the signal quality is too poor for enjoyable listening. Signals not suitable for good stereo reception can be silenced by switching the MUTING THRESHOLD selector for increased muting.

CLEAR SIGNAL

A unique feature of the TFM-1000 is the pushbutton-operated "Clear-Signal" indicator. This novel circuit uses a lamp to indicate the quality of the received signal. A flickering light (intensity modulation) signifies that some distortion, such as a multipath signal or fading is occurring. The lamp will flicker before such distortion is apparent to the human ear. This indicator makes it possible to set a rotating antenna to the proper direc-

tion, for the clearest signal, independent of signal strength, just by watching the CLEAR SIGNAL indicator and rotating the antenna to the position which gives the least flicker.

AUDIO CIRCUITS

The audio-frequency section, comprising eight low-noise silicon transistors, amplifies the left- and right-channel outputs of the multiplex decoder and provides both fixed-level and variable-level audio signals for the various output jacks of the tuner.

Four of the transistors in this section are used as low-distortion, wideband amplifiers and emitter followers, providing low-impedance sources for the MAIN and TAPE jacks in each channel; these low source impedances permit relatively long shielded cables to be used between the tuner and an external amplifier or tape recorder without any deterioration in signal quality. The emitter followers are connected directly to the TAPE jacks, providing them with fixed-level signals of about 2 volts RMS maximum at less than 0.15% harmonic distortion. The levels at the MAIN jacks can be varied in eight distinct steps by the OUTPUT LEVEL (DB) attenuator.

The remaining four transistors form a unique wideband, low-distortion driver circuit with multiple outputs for driving a pair of 600-ohm broadcast lines as well as high-quality stereo headphones (either low or high impedance) or low-level monitor speakers. Harmonic distortion is kept to less than 0.2% at maximum output (500 milliwatts) by using linear Class A operation and negative feedback in the driver stages in each channel and also by employing custom-wound output transformers having grain-oriented steel cores; these cores are extremely

large for the audio power levels encountered, ensuring excellent low-frequency response. Since the PHONES LEVEL control adjusts the PHONES and 600 OHM outputs simultaneously, the driver circuits have been designed so that the control setting that produces a 0-VU indication on a 600-ohm line during the *peaks* of music and speech coincides with a comfortable average headphone listening level.

REAR-CHASSIS AC RECEPTACLE

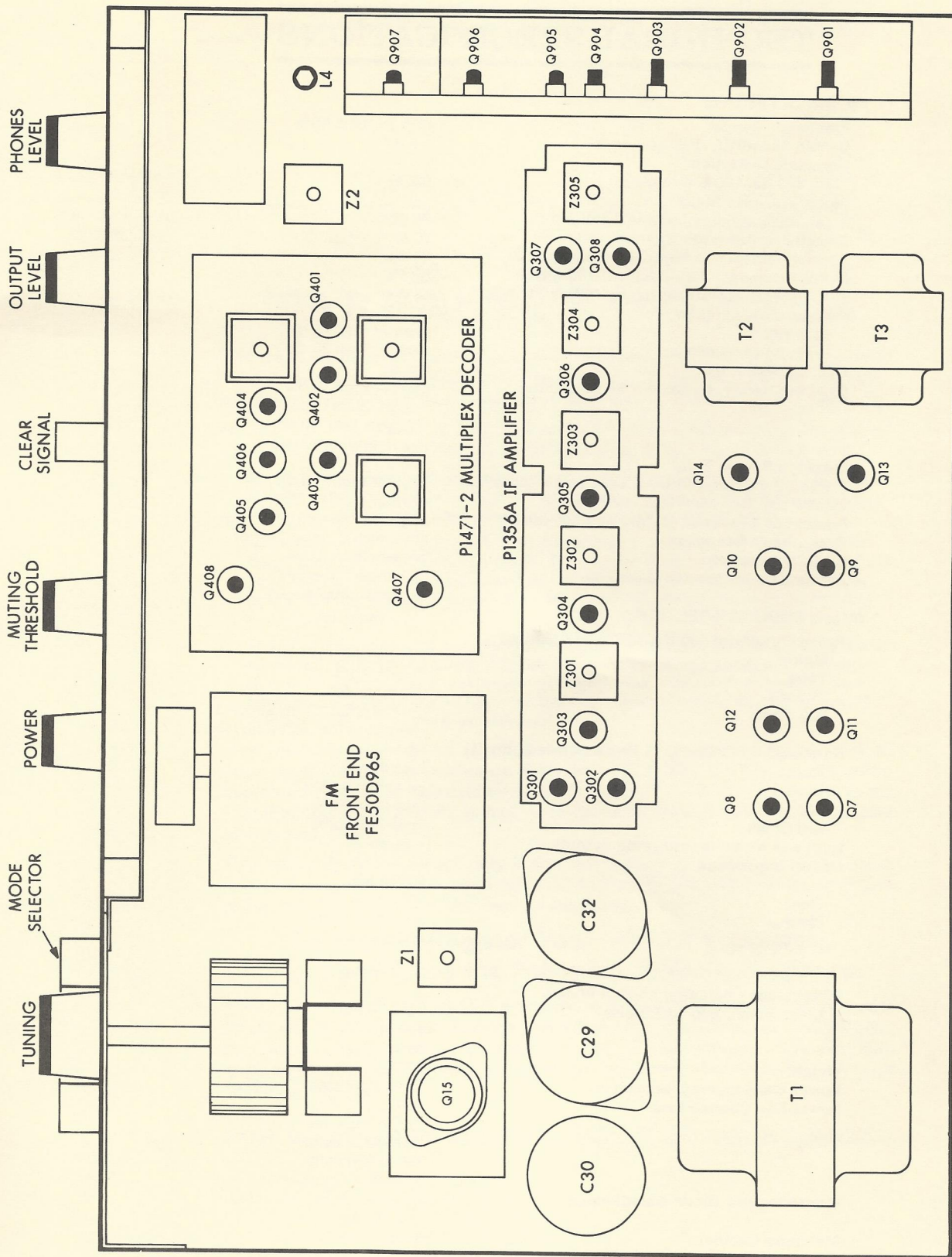
The single AC receptacle on the rear-chassis apron is connected in parallel to the power cord. It is not protected by the fuse adjacent to it and is not controlled by the front-panel POWER switch.

CAUTION: If the power transformer primary winding connections are changed for operation from a power-line voltage higher than the specified 135 volts at 150 watts, that higher voltage also will appear at the AC receptacle. For example, if the power transformer primary connections are set for 230 to 250 volts and the tuner is connected to a 250-volt power line with the existing line cord (by changing the line-cord plug) then 250 volts will be available at the rear-chassis receptacle.

FUSE

The fuse protects the electronics chassis. It is not part of the AC receptacle circuit. When reconnecting the power-transformer primary for 200-230 or 230-250 volt operation, the value of the fuse must be changed to 0.25 ampere. The 0.5-ampere value is not enough protection at the higher voltage. It is intended only for 100-115 or 115-135 volt operation.





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Figure 7. Chassis Layout (Top View)

TECHNICAL SPECIFICATIONS

FM TUNER SECTION:

Frequency Range	87.5 to 108.5 MHz
Usable Sensitivity, IHF Standard	1.8 μ V
Harmonic Distortion (at 400 Hz, 100% modulation)	0.2 %
Signal-to-Noise Ratio (at 100% modulation and 1 mV input)	70 db
Selectivity, Alternate Channel, IHF	70 db
Spurious Response Rejection (at 100 MHz)	90 db
Image Frequency Rejection (at 100 MHz)	80 db
IF Frequency Rejection (at 100 MHz)	95 db
FM-Stereo Separation At 1 kHz	greater than 40 db
From 50 to 15,000 Hz	greater than 30 db
Capture Ratio, IHF	0.6 db
Dynamic Range, Automatic RF Attenuator	greater than 40 db (operative from signals higher than 10 mV at antenna terminals)
Dynamic Range, Total (RF attenuator, FM front end, and IF amplifier)	greater than 120 db
Limiter and Detector Bandwidth	greater than 10 MHz
Frequency Response (before deemphasis)	20 Hz to 100 kHz \pm 0.5 db
Deemphasis Response	standard 75 μ sec \pm 1 db
SCA Suppression	greater than 70 db
Antenna inputs (switch selected)	300 ohms balanced 75 ohms unbalanced

AUDIO AMPLIFIER SECTION:

Rated Output (at 400 Hz, 100% modulation)	
Main	2 volts RMS
Tape	2 volts RMS
Phones	500 milliwatts
600 Ohms	greater than 10 db above 1 milliwatt into 600-ohm load
Harmonic Distortion (at 1 kHz and rated output)	
Main	less than 0.15%
Tape	less than 0.15%
Phones	less than 0.2%
600 Ohms	less than 0.2%
Hum and Noise (below rated output)	-75 db
Output Impedance	
Main	600 ohms
Tape	500 ohms
Phones	less than 1 ohm
600 Ohms	600 ohms

GENERAL:

Dimensions (including control knobs, dress panel, and fuse post)	16 ³ / ₄ " wide 5 ¹ / ₈ " high 12 ³ / ₈ " deep
Weight	18 lbs.
Power Consumption, Maximum	30 watts/40 VA
Power-line Connections	100 to 115 volts 115 to 135 volts 200 to 230 volts 230 to 250 volts
Transistor and Diode Complement	50 to 60 Hz (cps) AC 42 transistors (including 3 FET's), 45 diodes
Matching Cabinet	Model 100-UW, Walnut

Megahertz (MHz) and KiloHertz (kHz) have been used in this material to conform to the standards established by the IEEE. They replace Megacycles (mc) and Kilocycles (kc) respectively.

Because its products are subject to continuous improvement, Fisher Radio Corporation reserves the right to modify any design or specification without notice and without incurring any obligation.

WARRANTY TO OWNER

The warranty on a product reflects the confidence of its maker in the quality of materials and workmanship that go into it. The unique FISHER warranty has been established to protect your investment. Please read it carefully.

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

All parts (except tubes) are guaranteed for two years. Tubes are guaranteed for one year. Any defective part will be repaired or replaced without charge. During the first ninety days there is no charge for warranty labor.

Defective parts or equipment must be returned properly packed, transportation prepaid, to the FISHER dealer from whom it was originally purchased, or to a FISHER Authorized Service Center, or, after written authorization, to the FISHER plant. All warranty service is F.O.B. the dealer, service center, or FISHER plant.

The warranty is void if our inspection shows that the equipment has been tampered with, or installed, altered or repaired at variance with factory-designated procedures, subjected to negligence, misuse or accident, damaged by excessive line voltage or insufficient ventilation, or had its serial number altered, defaced or removed.

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

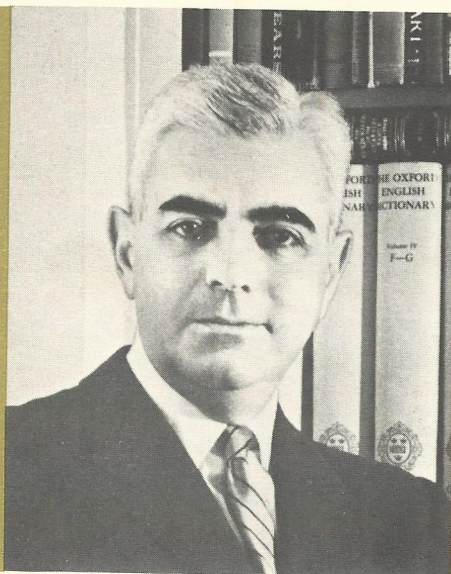
This warranty takes effect only if the warranty-registration card has been fully and properly filled out and returned to FISHER RADIO CORPORATION within ten (10) days from the date of purchase.

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

- Full benefits of the FISHER warranty.
- Prompt handling of correspondence with our Customer Service Department.
- Assistance in finding your equipment or establishing its value in case of loss through theft, fire, etc.
- Receipt of FISHER news bulletins on important developments in high fidelity equipment.

FOR WARRANTY SERVICE, CONSULT YOUR DEALER

THE MAN BEHIND THE PRODUCT



AVERY FISHER
Founder and President,
Fisher Radio Corporation

Twenty-seven 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, N. Y.



FISHER RADIO CORPORATION
LONG ISLAND CITY 1 • NEW YORK



FISHER RADIO CORPORATION

11-40 FORTY-FIFTH ROAD • LONG ISLAND CITY, N. Y. 11101



May 1, 1969

ANNOUNCING OUR 1969 VACATION SCHEDULE
SERVICE, CUSTOMER RELATIONS AND PARTS DEPARTMENTS

∩∩ To assure you of the quickest and most efficient handling of correspondence, repairs and parts orders utilizing our full technical staff, we have scheduled a uniform vacation period for the entire service complex.

THE ABOVE DEPARTMENTS WILL BE CLOSED

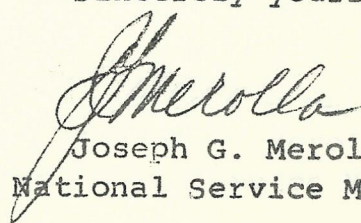
FROM: 5:15 P.M. THURSDAY, JUNE 26th

TO: 8:30 A.M. MONDAY, JULY 14th

∩∩ Please do not send any material to these departments during this period. Failure to observe this request will result in serious delays in processing, and possible loss of your communication.

∩∩ Very best wishes for a happy vacation in 1969.

Sincerely yours,


Joseph G. Merolla
National Service Manager

P.S. Please post this notice as a reminder of our closing dates.

Gentlemen:

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

PLEASE PRINT

My name _____

Address _____

City _____ State _____

Please send copies of your literature to:

Name _____

Address _____

City _____ State _____

Name _____

Address _____

City _____ State _____

Name _____

Address _____

City _____ State _____

- You may use my name.
- Please do not use my name.

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

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

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

FILL OUT THIS CARD

SAVE FOR REFERENCE

For FACTORY SERVICE and REPLACEMENT PARTS

Write or Call

Service Department, **FISHER RADIO CORPORATION**

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

(212) 937-2100

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

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

MODEL _____ SERIAL NO. _____ PURCHASE DATE _____



BUSINESS REPLY MAIL
FIRST CLASS PERMIT No. 493, LONG ISLAND CITY, N. Y.

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