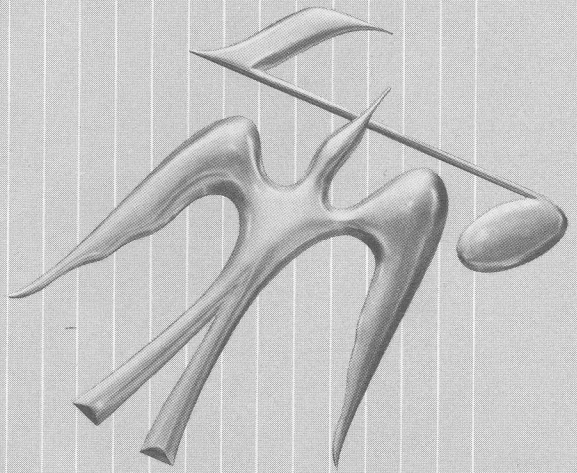
OPERATING INSTRUCTIONS AND WARRANTY



Serial # 35479 GX.

THE FISHER

X-100

STEREOPHONIC

Master Control Amplifier

PRICE $1.00

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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.

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Founder and President

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1948 First Dy...

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.

...

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.

THE FISHER X-100

STEREOPHONIC

Master Control Amplifier

THE FISHER *X-100* was designed to provide maximum circuit flexibility with operational simplicity at moderate cost, while maintaining the Laboratory Standards that distinguish all FISHER components. This has been achieved on a single superbly engineered chassis combining a stereophonic Preamplifier-Equalizer and Tone Control circuit, a dual-channel 40-watt Power Amplifier, and a self contained Power Supply. With the addition of two appropriate loudspeakers, or speaker systems (such as the FISHER XP-1), the *X-100* will perform as a stereophonic sound system of the highest quality.

The preamplifier section contains 14 input jacks to which may be connected every type of monophonic or stereophonic cartridge, tape recorder and tuner on the market. Located on the front panel are 16 controls and switches which permit the selection of any program source for either monophonic or stereophonic operation, and the adjustment of volume, balance, and tonal characteristics through every nuance of the audio spectrum. Advanced electronic circuitry, and the careful selection of parts, reduce hum, noise and distortion below the threshold of audibility. The power amplifier section, equipped with matched pairs of EL84's, has excellent overload characteristics and a very short recovery time, resulting in performance that is superior to amplifiers with a higher power rating. A switch-controlled Center Channel output jack is included to which a third amplifier and loudspeaker may be connected to augment the stereophonic sound pattern.

Once you have operated the *X-100*, you will realize why FISHER products have achieved a world-wide reputation. The quality underlining this reputation will assure you of years of trouble-free operation and unsurpassed listening pleasure.

A NOTE ON STEREOPHONIC SOUND

THE DEVELOPMENT of stereophonic sound has brought us close to achieving "Concert Hall" realism in the home. This dual-channel system offers a distinct advantage over monophonic (single-channel) systems by virtue of two important audio characteristics: the dimensions of *direction* and *depth*. These live sound qualities are for the most part missing in monophonic systems because recordings are made and reproduced over a single channel. This is somewhat analogous to listening to music with one ear. Stereophonic recording techniques, however, utilize two separate banks of microphones which are positioned at the left and right sections of the orchestra. In this arrangement, the microphones receive the musical sounds in much the same manner as the two ears of a listener. The sound picked up by each

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bank of microphones is then fed to independent channels and recorded on disks or tape, or transmitted over separate channels of a stereophonic broadcast.

That is why two separate sound channels are required to reproduce a stereophonic recording or broadcast in the home. The stereo sound output of a record player, tape recorder or tuner is fed to two separate amplifier channels, which in turn drive two separate speaker systems. Thus, instruments located on the left and right sides of the orchestra are heard predominantly in the left and right speakers, respectively; while instruments located in the center appear to be heard mid-way between the two speaker systems. The result is a startling sense of *presence* realized only at a live orchestral performance.

INSTALLING THE X-100

WARNING: The FISHER *X-100* must *not* be operated before connecting loudspeakers, or equivalent load resistors, to the Speaker Terminals in each channel; otherwise, serious damage to the equipment may result. If you have not yet completed your stereophonic system, and are temporarily using only one channel of the *X-100*, use Channel A and be sure to connect an equivalent load resistor to the Speaker Terminals of the unused channel. See "Speaker Connections."

This unit may be installed in any convenient location receiving adequate ventilation. This is important since excessive heat will shorten the life of any electronic instrument. Do not install the *X-100* above other heat-producing equipment or in a totally enclosed area. If you install it in a cabinet, leave the back open and at *least* two inches away from the wall. If the cabinet is made of wood, provide ventilation grilles on top and leave at *least* 4 inches of space between the top of the tubes and the cabinet, and at *least* 2 inches on each side.

Should you wish to install the *X-100* in your own cabinet, directions and diagrams are provided in the last section of this booklet. (Two FISHER cabinets are available from your FISHER dealer. These are the Model MC-2, in metal, and the 10-U in walnut and mahogany.

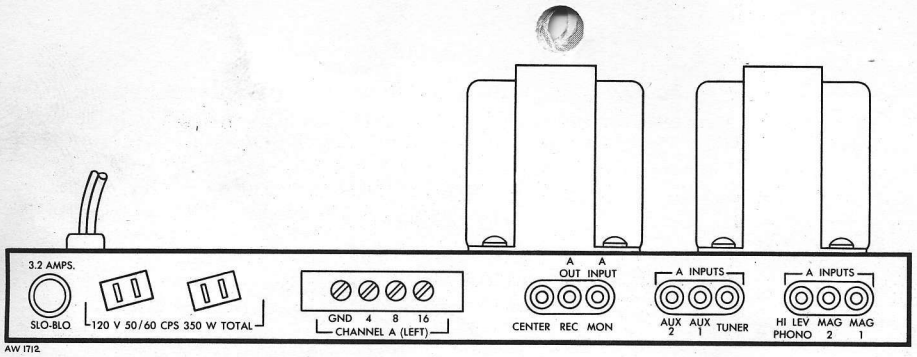


FIGURE 1. Rear panel of X-100

Either will convert the *X-100* into an attractive part of your room decor.) Temporarily, place the unit in its approximate location to permit an estimate of cable lengths to associated components.

Location of Loudspeakers

To obtain optimum stereophonic performance from your FISHER equipment, use two loudspeakers, or speaker systems, as nearly alike as possible. Stereophonic sound utilizes the left and right speakers to coincide with the music originating on the left and right sides of an orchestra, respectively. To recreate the original orchestral placement in your room, connect the speaker on your left (as viewed from the listening area) to the Channel A speaker terminals, and the speaker on your right to the Channel B speaker terminals. Certain precautions should be observed in the final location of these speakers.

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

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

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

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

Speaker Connections

Speaker terminal strips are provided for each channel to accommodate speakers, or speaker systems, having an approximate impedance of 4, 8, or 16 ohms. The connecting cable may be up to 100 feet in length, and ordinary lamp cord can be used. Connect one lead of the cable from the speaker on the left (as viewed from the listening area) to terminal 4, 8, or 16 of the Channel A terminal strip (depending on the impedance of the speaker) and the other lead to the GND terminal. Connect the speaker on your right to Channl B in the same manner.

IMPORTANT: If you are temporarily using only one channel, make connections to Channel A, and connect an 8-to 10-ohm, 10-watt load resistor to the speaker terminals for Channel B.

Connecting a Center Channel

In large rooms, where it may be necessary to space loudspeakers farther apart to cover a wider area, a "hole" may develop in the center. This apparent lack of sound in the center will become more noticeable as the distance between the two speakers is increased. It is possible to fill in this gap with the addition of a center channel amplifier and loudspeaker.

The *X-100* is equipped with a Center Channel output jack which is connected to a divider network across the output stages of Channel A and B. Equal portions of the audio output signal from each channel are thus combined to form a center "phantom" channel. By connecting an additional amplifier and loudspeaker to this output jack, and positioning the speaker between the left and right speakers, the stereophonic pattern of sound will be augmented.

The third amplifier need not be equipped with tone controls, since these are provided by the *X-100*. A volume control, or input level control, will be helpful, however, in order that the volume of the center speaker may be adjusted to the necessary level. Connect a short length of shielded cable, of the low-capacitance type, from the CENTER CHANNEL output jack on the rear panel of the *X-100* to an input of the center channel amplifier. The length of cable from the amplifier to the center speaker can be considerably longer (up to 100 feet, or more) depending on the type of amplifier used.

The center speaker can also be used in an adjoining room or some other remote location. Although the output from this extension speaker will be monophonic, it will contain the composite stereo signal.

CONNECTING ASSOCIATED COMPONENTS

ON THE REAR PANELS of the X-100 are 14 input jacks and 3 output jacks to which can be connected tuners, tape recorders, tape decks, and record players with ceramic and magnetic cartridges. (See Rear Panel, Figure 1.) The Channel A jacks are located directly on the rear panel, while the Channel B jacks are located on top of the chassis just above the rear panel. (See tube layout for the *X-100* Figure 2.) Information for connecting the various types of components are contained in this section. At the conclusion of this section, a table is provided, listing all inputs, their impedances, and the components that may be connected to them, in addition to those outlined here.

Auxiliary AC Receptacles

The two auxiliary receptacles on the rear panel may be used as power outlets for your associated components. The combined power consumption of these components may not exceed 350 watts. Power to the receptacles is supplied only when the power to the *X-100* is turned on.

Record Players and Changers

MAGNETIC STEREO CARTRIDGE: Connect the A and B output cables from the record player to the Channel A and B, MAG 2 input jacks.

MAGNETIC MONOPHONIC CARTRIDGE: Connect the output cable from the record player to the Channel A *or* B, MAG 2 input jack; (or to MAG 1 if these jacks are occupied.)

MAGNETIC HIGH LEVEL CARTRIDGE: Make connections to the Channel A and B, CER PHONO input jacks for the stereophonic type. Use Channel A *or* B for the monophonic type.

IMPORTANT: Because the impedance of these cartridges may vary with different manufacturers, a resistor may have to be strapped across the output terminals to insure the correct impedance match. Tables 1 and 2 will serve as a guide for using magnetic *low* level and magnetic *high* level cartridges, respectively. Remember to strap a resistor across *each output* of a *stereophonic* cartridge.

CERAMIC STEREO CARTRIDGE: Connect the A and B output cables from the record player to the Channel A and B, CER PHONO

input jacks. If these are occupied, you can use either AUX 1 or AUX 2 input jacks, but you will lose some bass response. (This loss can be compensated somewhat with the Bass controls.)

CERAMIC MONOPHONIC CARTRIDGE: Connect the output cable from the record player to the Channel A *or* B, CER PHONO input jack. If these are occupied, use either AUX 1 or AUX 2 input jacks.

IMPORTANT: Do not connect components to *both* the MAG 2 and CER PHONO input jacks at the same time These jacks are electrically parallelled and the input circuit will be overloaded.

Cartridge Loading impedance required	42K	39K	33K	27K	22K
Value of resistor to be added	none required	470K	150K	82K	47K

TABLE 1. Matching low level magnetic cartridges to MAG 2 inputs.

Cartridge Loading impedance required	100 K	82K	68K	56K	47K	39K	33K	27K	22K
Value of resistor to be added	none required	680K	220K	120K	100K	68K	47K	39K	27C

TABLE 2. Matching high level magnetic cartridges to MAG 1 and CER PHONO inputs.

Tape Decks

A tape deck is the tape transport mechanism minus the preamplifier and audio controls. To provide playback for recorded tapes, it must be connected to a control amplifier. These facilites are provided by the *X-100.*

STEREOPHONIC TAPE DECK: Connect the A and B (left and right) output cables from the tape deck to the Channel A and B, MAG 1 input jacks on the *X-100.*

MONOPHONIC TAPE DECK: Connect the output cable from the tape deck to the Channel A *or* B, MAG 1 input jack.

Tape Recorders

A standard stereophonic or monophonic tape recorder (equipped with its own preamplifier) may be used with the *X-100* in two ways. First, it can be used to record the output of any component being played through the *X-100.* Secondly, it can play through the *X-100* previously recorded program material. Permanent connections between the recorder and the *X-100* can be made to carry out these functions.

RECORDING CONNECTIONS:

STEREOPHONIC RECORDER: Connect cables from the Channel A and B, REC output jacks on the *X-100* to the A and B (left and right) recording input jacks on the recorder.

MONOPHONIC RECORDER: Connect a cable from the Channel A or B, REC output jack on the *X-100* to the recording input jack on the recorder.

NOTE: Any program source connected to the Channel A *or* B input jacks of the *X-100* can be fed to *either* or *both* REC output jacks, depending on the position of the Mode Selector switch.

PLAYBACK CONNECTIONS:

STEREOPHONIC RECORDER: Connect cables from the Channel A and B (left and right) output jacks on the recorder to the Channel A and B, AUX 1 or AUX 2 input jacks on the *X-100.*

MONOPHONIC RECORDER: Connect a cable from the output jack on the recorder to the Channel A *or* B, AUX 1 or AUX 2 input jack on the *X-100.*

MONITORING CONNECTIONS:

NOTE: These connections apply only to tape recorders equipped with *separate* recording and playback heads.

STEREOPHONIC RECORDER: Connect cables from the Channel A and B (left and right) output jacks on the recorder to the Channel A *and* B MON input jacks on the *X-100.*

MONOPHONIC RECORDER: Connect a cable from the output jack on the recorder to the Channel A *or* B MON input jack on the X-*100.*

Spacexpander

There are two possible methods of connecting the FISHER *Dynamic Spacexpander,* Model K-10. If your high fidelity system includes a tape recorder which is connected to the tape monitor facilities of the *X-100* (see preceding section), you should use the special jacks on the top of the *X-100 chassis* for the connection of the *Spacexpander.* In this case, you will be able to add reverberation directly to your tape recordings, but you will not be able to add additional reverberation during playbacks. If you wish to add reverberation during playback, connect the output cables from your tape recorder to a pair of AUX inputs on the *X-100.* On the other hand, the *Spacexpander* should be connected to the tape monitor facilities if they are not being used with a tape recorder since this will permit you to use the Tape Monitor switch as a reverberation on-off switch.

CONNECTIONS WHEN USING A THREE-HEAD TAPE RECORDER:

1—Locate the special *Spacexpander* jacks on the top of the *X-100* chassis; remove the shorting bars and store them in a safe place for possible future use.

2—Make the following connections:

a) CHANNEL A OUT jack on *X-100* to CHANNEL A OUTPUT jack on *Spacexpander.*

b) CHANNEL A IN jack on *X-100* to CHANNEL A INPUT jack on *Spacexpander.*

c) CHANNEL B OUT jack on *X-100* to CHANNEL B OUTPUT jack on *Spacexpander.*

d) CHANNEL B IN jack on *X-100* to CHANNEL B INPUT jack on *Spacexpander.*

CAUTION: The shorting bars must be inserted as shown in Figure 4 when the *Spacexpander* is not connected to the *X-100.* Otherwise, the *X-100* will be completely inoperative.

CONNECTIONS WHEN NOT USING A THREE-HEAD TAPE RECORDER:

1—Channel A REC output jack on *X-100* to CHANNEL A INPUT jack on *Spacexpander.*

2—Channel A MON input jack on *X-100* to CHANNEL A OUTPUT jack on *Spacexpander.*

3—Channel B REC output jack on *X-100* to CHANNEL B INPUT jack on *Spacexpander.*

4—Channel B MON input jack on *X-100* to CHANNEL B OUTPUT jack on *Spacexpander.*

Tuners

The *X-100* is equipped to accommodate various combinations of Tuner outputs. These include monophonic FM, monophonic AM, monophonic FM-AM *stereophonic* FM-AM, and stereophonic FM-Multiplex.

MONOPHONIC FM AND/OR AM: Connect an output cable from the FM tuner to Channel A TUNER input jack, and a cable from the AM Tuner to Channel B TUNER input jack.

STEREOPHONIC FM-AM: Connect a cable from the FM section of the Tuner to Channel A TUNER input jack, and a cable from the AM section to the Channel B TUNER input jack.

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

INPUT JACK	IMPEDANCE	LEVEL	COMPONENTS TO CONNECT
MAG 1†	100K	Low	Tape Deck ((or low level Magnetic Cartridge, if MAG 2 is occupied.)
MAG 2*†	42K	Low	Magnetic Cartridge (low level.)
CER PHONO*†	100K	Medium	Magnetic Cartridge (high level.) Ceramic Cartridge.
AUX 1	560K	High	Tape Recorder (with *common* playback and recording head.) FM, AM, and FM-AM Tuner. Short-Wave Tuner. TV sound output.
AUX 2	560K	High	Same as above.
TUNER	560K	High	FM, AM and FM-AM Tuner.
MON	260K	High	Tape Recorder (with *separate* playback and recording heads.) Other high level signal sources (as in the AUX inputs.)

*Do not connect components to the MAG 2 and CER PHONO input jacks at the same time. These jacks are electrically parallelled and input circuit will be overloaded.

†The impedance of these jacks (MAG 1 and MAG 2) can be changed, to accommodate cartridges of different impedances, by strapping a resistor across the cartridge or the input jack. See Tables 1 and 2.

TABLE 3. Component Connections to Input Jacks

broadcast is heard on Channel B (right speaker.) If you are using a *monophonic* FM-AM Tuner, you must connect an additional AM or FM Tuner to the *X-100* to listen to FM-AM stereo broadcasts.

STEREOPHONIC FM-MULTIPLEX: To receive the FM-multiplex signal, your tuner must either be equipped with an adaptor, or must already be an FM-multiplex receiver. Connect the adaptor and Tuner, or the Tuner to the *X-100* as described in the operating instructions for these units.

Other Program Sources

If you wish to connect a short-wave tuner or the audio output from your TV set to the *X-100*, use Channel A or B, AUX 1 or AUX 2 input jacks: WARNING: Consult with your serviceman before you make connections from your TV set.

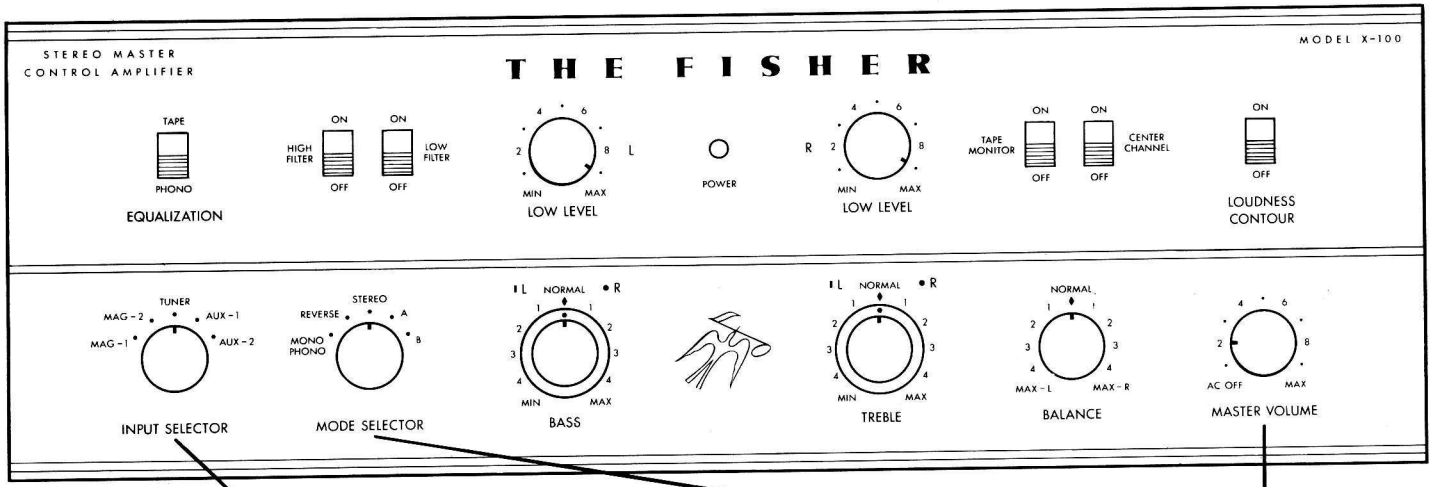
HOW TO USE THE CONTROLS

AFTER YOU HAVE MADE all necessary connections, plug the power cable extending from the rear into a wall outlet supplying 105 to 120 volts AC *only*, at 50 to 60 cycles. (Where line voltage is lower or higher, a step-up or step-down transformer will be necessary.) Total power consumption for this unit, *not including associated components*, is 160 watts. All operating controls are on the front panel as illustrated on page 8. An explanation of the function of each control is provided in the following section. A simplified Step-By-Step Operating Guide is furnished at the conclusion of this section. This Guide will enable you to select any program source you wish to hear and to set all necessary controls in a matter of seconds.

AC Off and Master Volume

The AC off switch supplies power to the *X-100* and is combined

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



STEP 2

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

MAG-1 or MAG-2 to play records on a player connected to the MAG-1 or MAG-2 jacks.

TUNER to listen to a radio broadcast.

AUX-1 or AUX-2 to listen to any other program source connected to the AUX inputs.

STEP 3

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

MONO PHONO to play monophonic records with a stereo cartridge.

STEREO to listen to *all* stereo program material.

A for any monophonic program source connected to Channel A.

B for any monophonic program source connected to Channel B.

STEP 1

Set all switches and controls as shown. Turn on power by turning ***MASTER VOLUME*** control slightly clockwise until it clicks. Adjust later for volume.

with the Master Volume control. Turning this switch slightly clockwise until it clicks will supply power to the unit, as well as to any components connected to the Auxiliary AC receptacles, and light the green jewel. The Master Volume control varies the level of sound simultaneously on both channels. Turning this control in a clockwise direction increases the sound level at both speaker systems.

Input Selector Switch

This five-position switch is used to select any component connected to the input jacks of the *X-100*. The positions have the following purpose:

MAG 1: Selects a tape deck (or a record player equipped with a low-level magnetic cartridge), connected to the MAG 1 input jacks.

MAG 2: This position selects a record player equipped with a low-level magnetic cartridge, or a high level magnetic or ceramic cartridge, connected to the MAG 2 or CER PHONO input jacks.

TUNER: Use this position to select a tuner, or tuners, connected to the TUN input jacks.

AUX 1: In this position, you can select any component connected to the AUX 1 input jacks, whether a tape recorder, or any other high level component.

AUX 2: Use this position to select any component connected to the AUX 2 input jacks.

Tape Monitor Switch

The Tape Monitor switch (the third slide switch from the right) is used in the ON position only to playback recorded material from a tape recorder equipped with *separate recording and playback heads*, or to monitor this type of recorder while making a tape recording. This switch must remain in the OFF position *at all other times*, otherwise the *X-100* will be inoperative. (Of course, if this type of recorder is connected to the AUX input jacks instead of the MON input jacks, the Tape Monitor switch should also be in the OFF position.)

Equalization Switch

The Equalization switch is effective *only* when the Input Selector switch is in either MAG 1 or MAG 2 position; that is, when you are playing either records, or tape (from a tape deck). Its purpose is to provide RIAA equalization on PHONO position, and NARTB equalization on TAPE position. Set this switch to either PHONO or TAPE position, depending upon which type of program source you are playing. (This switch does *not* provide equalization for tape from a tape recorder, since this unit is connected to the AUX inputs.) To maintain the two types of equalization, the Bass and Treble controls should, of course, be in NORMAL position.

Mode Selector

After you have selected a particular program source with the Input Selector switch, the Mode Selector switch must be set in accordance with the *type* of program source—whether monophonic or stereophonic. Each position of this switch has the following function:

MONO PHONO: Use this position to play *monophonic* records if your record player is stereophonic. The monophonic signal from the record will be fed to both channels and heard on both speakers, resulting in a superior monophonic effect. In addition, rumble and noise due to vertical stylus movement will be completely eliminated.

REVERSE: Use this position only if the stereo arrangement at the program source is reversed. The signal from Channel A will be switched to Channel B, while the signal from Channel B will be switched to Channel A.

STEREO: This is the normal listening position for *all* stereophonic program sources, whether record, tape, or stereo broadcast. The signal from Channel A will be heard on the left speaker, and the signal from Channel B will be heard on the right speaker.

A: In this position, the signal from any monophonic component connected to the input jacks in Channel A is fed to both channels and will be heard on both speakers to provide a superior monophonic effect. This may include a monophonic record player, tape deck, etc.

B: In this position, the signal from any monophonic component connected to the Channel B input jacks will also be heard on both speakers.

Low Level Controls

In a fully clockwise position, these controls will permit the full signal level from any components connected to the MAG 1, MAG 2, and CER PHONO input jacks to be fed to the amplifiers in Channel A and B. Use the numerical markers around each control as reference points.

Because the signals from the different program sources connected to the *X-100* may vary in strength, the sound level at the speakers may vary in intensity as you turn the Input Selector switch from one program source to another. This may require the readjustment of the Master Volume control each time a change is made. To minimize this condition, it is advisable to equalize the signal level from your associated components.

Most components are equipped with Level or Volume controls. These have the same function as the Low Level controls. The signal level from each component can be adjusted by ear in the following manner:

1—Turn all Level controls on your components (including the Low Level controls) to *minimum.*

2—Turn the Master Volume control on the *X-100* to *maximum.*

3—Adjust the Low level controls until the volume at the speakers is as loud as you will ever wish to hear it.

4—Turn the Input Selector switch to each position in turn and adjust the Level controls on the other components until the sound at the speakers is approximately equal to that of the MAG positions.

Balance Control

This control permits you to obtain equal sound levels at both speaker systems — an important consideration for achieving the optimum stereophonic effect. (This is also advantageous for monophonic operation where two channels are used.) With the Balance control pointing to NORMAL, the volume at the left and right speakers should be the same, theoretically. However, an imbalance may occur due to room acoustics, record characteristics, listener position, different speaker efficiencies etc. This imbalance can be corrected easily by turning the control slightly towad MAX-A or MAX-B to increase the volume level at the left or right speaker, as required. It should be pointed out that this is not a volume control; for, as the level of sound is increased on one speaker, it is decreased on the other, maintaining the same overall sound output.

NOTE: It is possible to cut off the sound entirely from the left or right speaker system by advancing the Balance control to the extreme MAX-B or MAX-A position.

Bass and Treble Controls

These controls enable you to adjust the tonal qualities of sound to your personal listening requirements. The Bass controls vary the intensity of the low frequency bass tones, while the Treble controls vary the intensity of the high frequency treble tones. Each set of controls consists of dual knobs mounted one behind the other. The smaller knobs, with the black bar markers, are the controls for Channel A; the large outer knobs, with the dots, control Channel B. Turning either knob, will turn the other, thus permitting simultaneous adjustment for both channels. However, if you wish to adjust the tones for each channel separately, hold one knob while turning the other. To increase or decrease bass or treble intensity, turn these knobs toward MAX or MIN, as required.

The numbered positions around each set of controls may be used as reference points. To listen to program material exactly as it originates from a broadcasting studio, set these controls to NORMAL. This is "flat" position, and is equivalent to RIAA equalization. When you are listening to a record, or tape from a tape deck, you will maintain the equalization established by the Equalization switch by leaving these controls in NORMAL position. It should be emphasized, however, that the Bass and Treble controls may be set to any position dictated by personal listening preferences.

Loudness Contour Switch

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

If you wish to listen at low volume, set the Loudness Contour switch to ON. Compensation will be introduced to restore the highs and lows to a level with your middle-frequency hearing sensitivity. This compensation will increase or decrease automatically as the volume is lowered or raised. In general, it is suggested that this switch be used only with the medium-low to low volume; otherwise, unrealistic sound will result.

High Filter Switch

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

Low Filter Switch

Use the Low Filter switch in the ON position to eliminate turntable rumble, or other low frequency interference. Leave this switch in OFF position at all other times.

Center Channel Switch

If a center channel amplifier, and loudspeaker system, is connected to the *X-100* (as described on page 4) set this switch to ON position to feed a composite stereo signal to this amplifier. Remember that the purpose of the center amplifier and loudspeaker is to eliminate the "hole in the middle" effect. It is only necessary, therefore, to increase the volume level at the center speaker just enough to augment the stereophonic sound pattern. Raising the center volume to a very high level can diminish the stereophonic effect.

Note: The Master Volume control on the *X-100* will still affect the over all volume at the left and right speakers, as well as at the center speaker.

Bias Adjust Control

This control, located on top of the chassis, is not used during normal operation. Its purpose is to maintain proper operating conditions for the power amplifier circuits, and is used only for servicing adjustments. The adjustment procedure is described in the service manual for the *X-100*. Do not attempt to adjust this control, without *first consulting the service manual.*

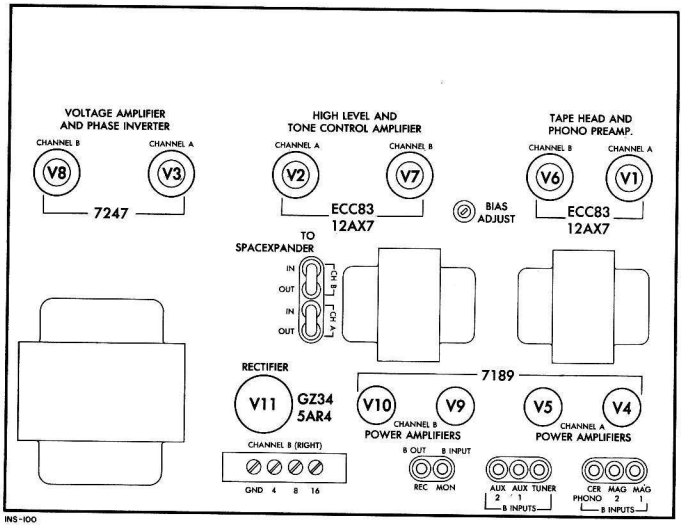


FIGURE 2. Tube layout for X-100

Program You Wish To Hear	Required Connections To Associated Components	Set Input Selector Switch To	Set Mode Selector Switch To	• Other Required Control Settings • *IMPORTANT:* Tape Monitor Switch must be in OFF position *at all times* except as noted.
1. FM Broadcast	FM Tuner connected to Channel A TUNER input jack.	TUNER	A	*NOTE:* If you are using an FM-AM monophonic Tuner, set Mode Selector switch to either A or B, depending on Channel to which Tuner is connected.
2. AM Broadcast	AM Tuner connected to Channel B TUNER input jack.	TUNER	B	
3. FM-AM Stereo Broadcast	FM Tuner section connected to Ch. A TUNER input jack; AM Tuner section connected to Ch. B TUNER input jack.	TUNER	STEREO	If AM Tuner has Bandwidth switch, use BROAD position.
4. FM-Multiplex Stereophonic Broadcast	Multiplex Adaptor connected to FM Tuner. See instructions accompanying Adaptor.	TUNER	STEREO	
5. Stereophonic Record	Low Level Magnetic Cartridge: make connections to MAG 2 input jacks (or MAG 1 jacks, if these are not occupied) High Level Magnetic and Ceramic Cartridge: make connections to CER PHONO input jacks. NOTE: do *not* connect components to *both* MAG 2 and CER PHONO jacks.	MAG 2 or MAG 1 depending on inputs used.	STEREO	Set Equalization switch to PHONO.
6. Monophonic Record	Same as above, except use Channel A or B input jacks.	MAG 2 or MAG 1 depending on inputs used.	MONO PHONO	Set Equalization switch to PHONO. *NOTE:* If you are using a monophonic cartridge, set Mode Selector switch to A or B, depending on channel used.

GUIDE FOR X-100

Program You Wish To Hear	Required Connections To Associated Components	Set Input Selector Switch To	Set Mode Selector Switch To	• Other Required Control Settings • *IMPORTANT:* Tape Monitor Switch must be in OFF position *at all times* except as noted.
7. Tape from *stereo* Tape Recorder with *Common* playback and recording heads	Cables from A and B output jacks on Recorder to Ch. A and B AUX jacks. *Recording Connections:* Cables from CH. A and B REC jacks on the X-100 to the recording inputs on the Recorder.	AUX 1 or AUX 2 or AUX 2 depending on inputs used.	STEREO	
8. Tape from *stereo* Tape Recorder with *Separate* playback and recording heads	Cables from A and B output jacks on Recorder to Ch. A and B REC jacks on the X-100 to the recording inputs on the Recorder.	*Tape Monitor Switch* set to ON	STEREO	Set Tape Monitor switch to ON. (If you wish to record, return this switch to OFF.)
9. Tape from *stereo* Tape Deck	Cables from Tape Deck to Ch. A and B MAG 1 input jacks.	MAG 1	STEREO	Set Equalization switch to TAPE.
10. Tape from *monophonic* Tape Recorder with *Common* playback and recording head	Cable from output jack on Recorder to Channel A or B, AUX 1 or AUX 2 input jack. *Recording Connections:* Cable from recording jack of Recorder to CH. A or B REC jack (same channel as above.)	AUX 1 or AUX 2 depending on channel used.	A or B depending on channel used.	
11. Tape from *monophonic* Tape Recorder with *Separate* playback and recording heads	Cable from output jack on Recorder to Channel A or B MON jack. *Recording Connections:* Cable from recording jack to Channel A or B REC jack (same channel as above.)	*Tape Monitor Switch* set to ON	A or B depending on channel used.	Set Tape Monitor switch to ON. (If you wish to record, return this switch to OFF.)
12. Tape from *monophonic* Tape Deck	Cable from Tape Deck to Channel A or B TAPE HEAD input jack.	MAG 1	A or B depending on channel used.	Set Equalization switch to TAPE.

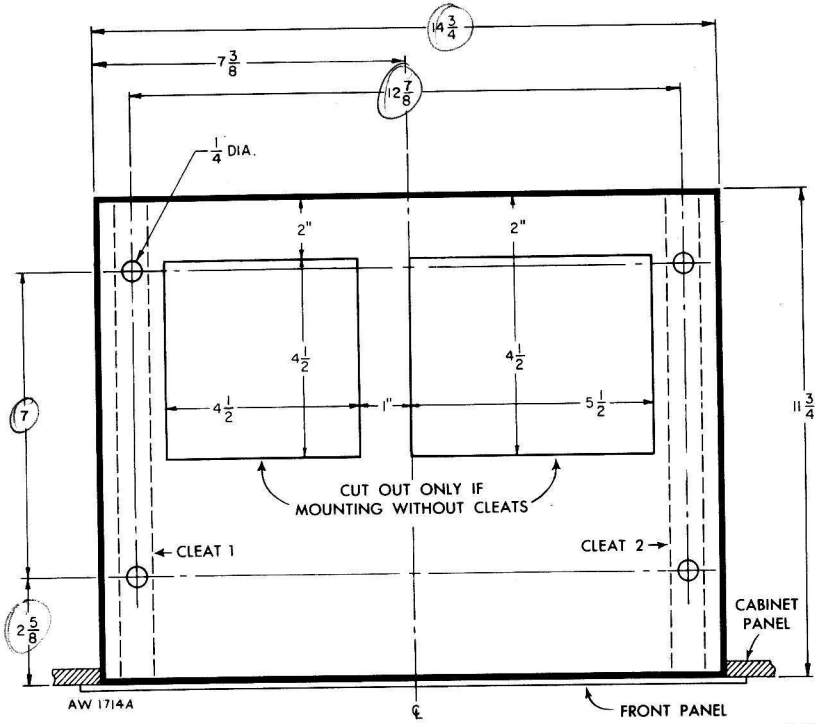


FIGURE 3. Top view of custom cabinet installation

CUSTOM INSTALLATION

TWO SPECIAL CUSTOM CABINETS, designed to accommodate the *X-100*, are available from your FISHER dealer. These are the Model MC-2 metal cabinet, with vinyl covering, and the Model 10-U wood cabinet, in walnut and mahogany. Both are attractively designed to enhance your room decor. The *X-100* may also be mounted in your own custom cabinet. Directions and illustrations are provided in this section.

Because adequate ventilation is an absolute essential for trouble-free operation, never install the *X-100* in a totally enclosed space, on top of another amplifier, or too close to other heat-producing equipment. If it is installed in a cabinet, the back should remain open and not be flush with the wall. If the cabinet is equipped with ventilation grilles on top, do not block the passage of air with books or other articles.

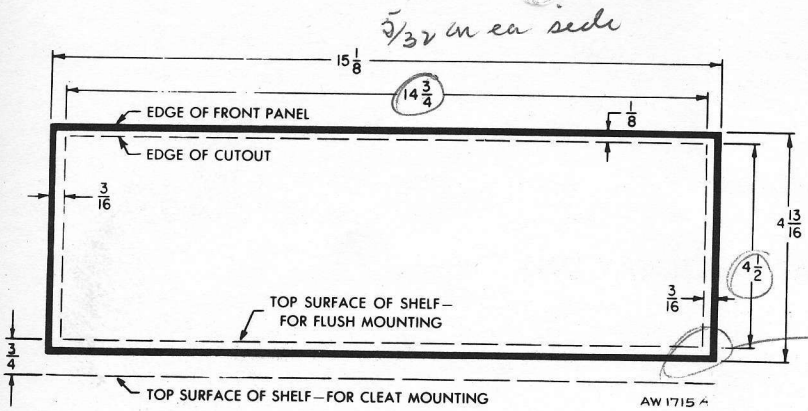


FIGURE 4. Front panel cutout for mounting

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

Installation with Cleats

1—Obtain a strip of wood ¾ inches square and 22 inches long. Cut this strip in half to form two 11-inch cleats.

2—Fasten the two cleats to the top of the mounting board with wood screws in the position shown in Figure 3. Then locate and drill four ¼-inch holes through the mounting board and cleats as indicated.

3—Saw a cutout through the front panel of your cabinet (4½ inches by 14¾ inches) as shown in Figure 4. 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 bottom cover of the *X-100* and insert the chassis through the *front* of the panel cutout. Slide the chassis into the cabinet until the back of the control panel is tight against the panel of the cabinet.

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

Installation Without Cleats

1—Cutouts must be made in the mounting board beneath the ventilation holes in the bottom of the *X-100*, as shown in Figure 3.

2—Locate and drill four ¼-inch holes in the mounting board as shown in Figure 3.

3—Saw a rectangular cutout through the front panel of the cabinet (4½ inches by 14¾ inches) as shown in Figure 4. IMPORTANT: Note that the bottom edge of the cutout is flush with the top of the mounting board.

4—Remove the four plastic feet from the *X-100* and insert the chassis through the front of the panel cutout. Slide the chassis in all the way until the back of the control panel fits tightly against the panel of the cabinet.

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

TECHNICAL SPECIFICATIONS

MUSIC POWER OUTPUT: 40 watts both channel (IHFM Standard)

HARMONIC DISTORTION: 0.5% at 17 watts (RMS.)
0.8% at 20 (Music Power each channel)

FREQUENCY RESPONSE: ±1db from 20 to 20,000 cps.

HUM AND NOISE: *With volume control at minimum:* more than 90 db below rated output.
High Level Inputs: (volume control at maximum) more than 80 db below rated output (0.5 volt reference level.)
Low Level Inputs: (RIAA; with volume control at maximum) more than 66 db below rated output (6 millivolts reference level.)

CHANNEL SEPARATION: Better than 50 db.

SENSITIVITY: *Low Level:* PHONO MAGNETIC: 3.6 millivolts for rated output.
TAPE: 2.2 millivolts for rated output.
PHONO CERAMIC: 180 millivolts for rated output.
High Level: TUNER: 220 millivolts for rated output.
AUX 1: 220 millivolts for rated otuput.
AUX 2: 220 millivolts for rated output.
MONITOR: 500 millivolts for rated output.

RUMBLE FILTER: Slope is more than 15 db per octave (—3db at 45 cps.)

SCRATCH FILTER: Cut-off slope is more than 12 db per octave (—3 db at 5 KC.)

SUBSONIC FILTER: Steep Roll-off below 20 cps.

BASS CONTROLS: Boost: 15 db Cut: 15 db at 50 cps.

TREBLE CONTROLS: Boost 14 db Cut: 17 db at 10 KC.

POWER REQUIREMENTS: 105-120 volts AC, 50-60 cycles.

POWER CONSUMPTION: 160 watts.

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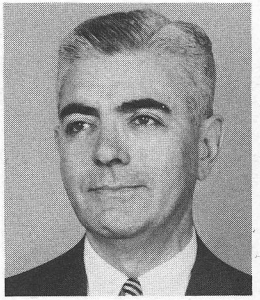
4—Remove the four plastic feet from the *X-100* a
through the front of the panel cutout. Slide the c
until the back of the control panel fits tightly a
the cabinet.

T

MUSIC POWER OUTPUT:	40 watts both channel
HARMONIC DISTORTION:	0.5% at 17 watts (RMS 0.8% at 20 (Music Po
FREQUENCY RESPONSE:	±1db from 20 to 20,0
HUM AND NOISE:	*With volume control* than 90 db below rate *High Level Inputs:* maximum) more than output (0.5 volt refere *Low Level Inputs:* (control at maximum) low rated output (6 level.)
CHANNEL SEPARATION:	Better than 50 db.
SENSITIVITY:	*Low Level:* PHONO millivolts TAPE: 2. output. PHONO

N781-103CX

The Man Behind the Product



AVERY FISHER
Founder and President,
Fisher Radio Corporation

TWENTY-FOUR YEARS AGO, Avery Fisher introduced America's first high fidelity radio-phonograph. That instrument attained instant recognition, for it opened a new era in the faithful reproduction of records and broadcasts. Some of its features were so basic that they are used in all high fidelity equipment to this day. One of these models is now in the permanent collection of the Smithsonian Institution as an example of the earliest high fidelity instruments commercially available in this country.

The engineering achievements of Avery Fisher and the world-wide reputation of his products have been the subject of descriptive and biographical articles in *Fortune, Time, Pageant, The New York Times, Life, Coronet, High Fidelity, Esquire, The Atlantic,* and other publications. Benefit concerts for the National Symphony Orchestra in Washington and the Philadelphia Orchestra, demonstrating recording techniques, and the great advances in the art of music reproduction, used FISHER high fidelity instruments both for recording and playback, to the enthralled audiences. FISHER equipment formed the key part of the high fidelity demonstration at the American National Exposition in Moscow, July 1959. FISHER FM and FM-AM tuners are the most widely used by broadcast stations for monitoring and relay work, and by research organizations—under conditions where absolute reliability and maximum sensitivity are a 'must.'

The FISHER instrument you have just purchased was designed to give you many years of pride and enjoyment. If you should desire information or assistance on the installation or performance of your FISHER, please write directly to Avery Fisher, President, Fisher Radio Corporation, Long Island City 1, New York.

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