INSTRUCTION MANUAL

TRIO



MODEL KW-33L

AM-FM-LW STEREO MULTIPLEX RECEIVER

TRIO now offers the new KW-33L Receiver with the latest design in FM Stereo Multiplex Circuitry, as well as exclusive front panel features for simple FM stereo musical listening.

You can enjoy FM MPX stereo broadcasts as easily as in the case of FM monophonic broadcasts with the help of an ingenious invention that shows instantly whether or not an FM station is broadcasting in stereo.

This newest and most impressive FM stereo multiplex receiver is simple, versatile and handsome, and it has been carefully designed under rigid engineering requirements. The KW-33L provides a total of 28 watts music power (IHF Standard) or 14 watts music power per channel with less than 1% distortion.

1. SPECIAL FEATURES OF KW-33L

1. The KW-33L provides a total power output of [28 watts music power (IHF Standard) or 14 watts music power per channel.]

2. Simple FM stereo tuning is possible by means of TRIO'S exclusive new foolproof Indicator System.

3. The built-in Noise Filter provides noisefree reception of FM Stereo Broadcasts even in fringe areas, and suppression of scratch noise of playing records.

4. Some FM stereo broadcasting stations emanate secondary signals such as background music, etc. When tuned to such a station, most receivers will pick up a steady beat interference. This TRIO unit, however, is equipped with a special circuitry completely eliminating such objectionable interference.

5. The loudness control assures the excitement and realism of a live concert.

6. Hum is entirely eliminated with DC filament supply system adapted to the equalizer circuit.

7. New professional-type tuning meter is provided for pinpoint tuning.

8. A convenient stereo headset jack is provided on the front panel enabling you to enjoy late hour broadcasts or record playing without disturbing others.

2. CONNECTIONS TO ASSOCIATED EQUIPMENT

LOUDSPEAKER CONNECTIONS

WARNING: Never operate the receiver without first connecting the speaker to each channel output.

The KW-33L has output terminals for connection to a speaker system of 8 or 16 ohm impedance. Wherever possible, it is recommended that identical speakers be used. For indoor installations, ordinary plastic-covered lamp cord can be used to connect speakers to the receiver, and may be extended as far as 100 feet without any significant power loss.

Connect the left-hand speaker to the terminals on the rear marked LEFT SPEAKER and the right-hand speaker to the terminals marked RIGHT SPEAKER.

Set IMP SELECT switch to either 8 ohm or 16 ohm, whichever is closest to the impedance of the speakers used.

STEREO HEADPHONES

The KW-33L is also equipped for stereophonic headphone listening. Simply plug the headphones into the jack provided.

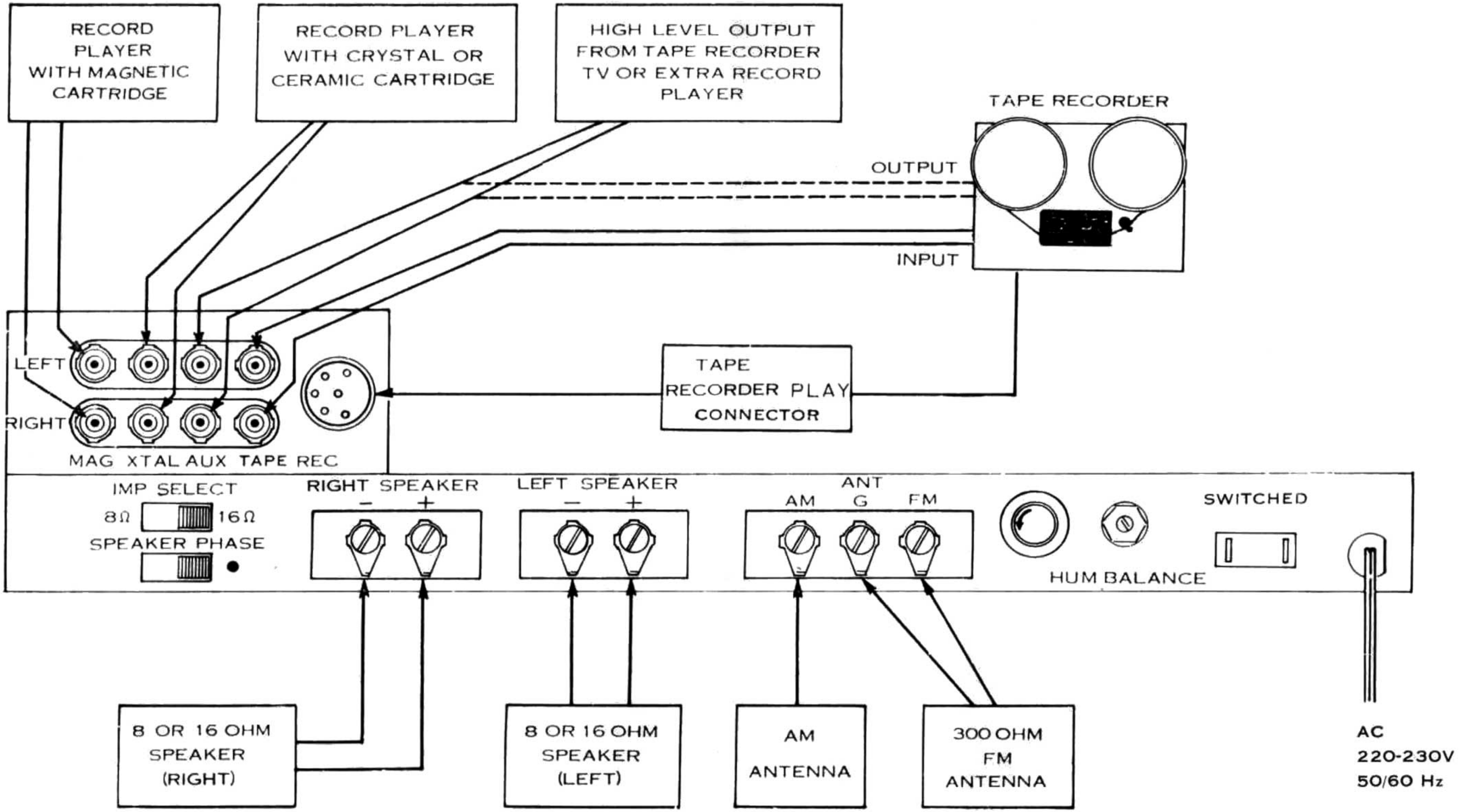
When it is desired to turn off the speakers and listen through headphones, connect an extra switch as shown in Fig. 1.

STEREO RECORD PLAYERS

The two shielded cables from your stereo record player should be terminated with RCA type phono plugs. To avoid loss in high frequency, cables should not exceed 10 feet in length.

LOW LEVEL PHONO INPUTS — Inputs from a magnetic or variable reluctance (constant-velocity type) cartridge should be connected to the jacks designated MAG.

INTERCONNECTING DIAGRAM



HIGH LEVEL PHONO INPUTS — Inputs from "Constant-Amplitude" phono cartridges such as crystal and ceramic types should be connected to the jacks designated XTAL.

TAPE RECORDERS

Outputs of stereo recorders having their own preamplifiers should be connected (by means of shielded cables and phono plugs) to the high level input jacks marked AUX. To avoid overloading the KW-33L, make use of the level controls available at the tape pre-amp. For recording purpose, use the output at the TAPE REC jacks, which should be connected to the tape recorder input by means of shielded cables. Listening to the original program material is still possible, since adjustment of the tone or volume controls have no effect on the signals at these jacks (TAPE REC).

TAPE RECORDER EQUIPPED WITH RP CORD

If you are using a tape recorder equipped with a RP cord, you can reproduce stereo recording merely by plugging the cord into the socket provided for this purpose.

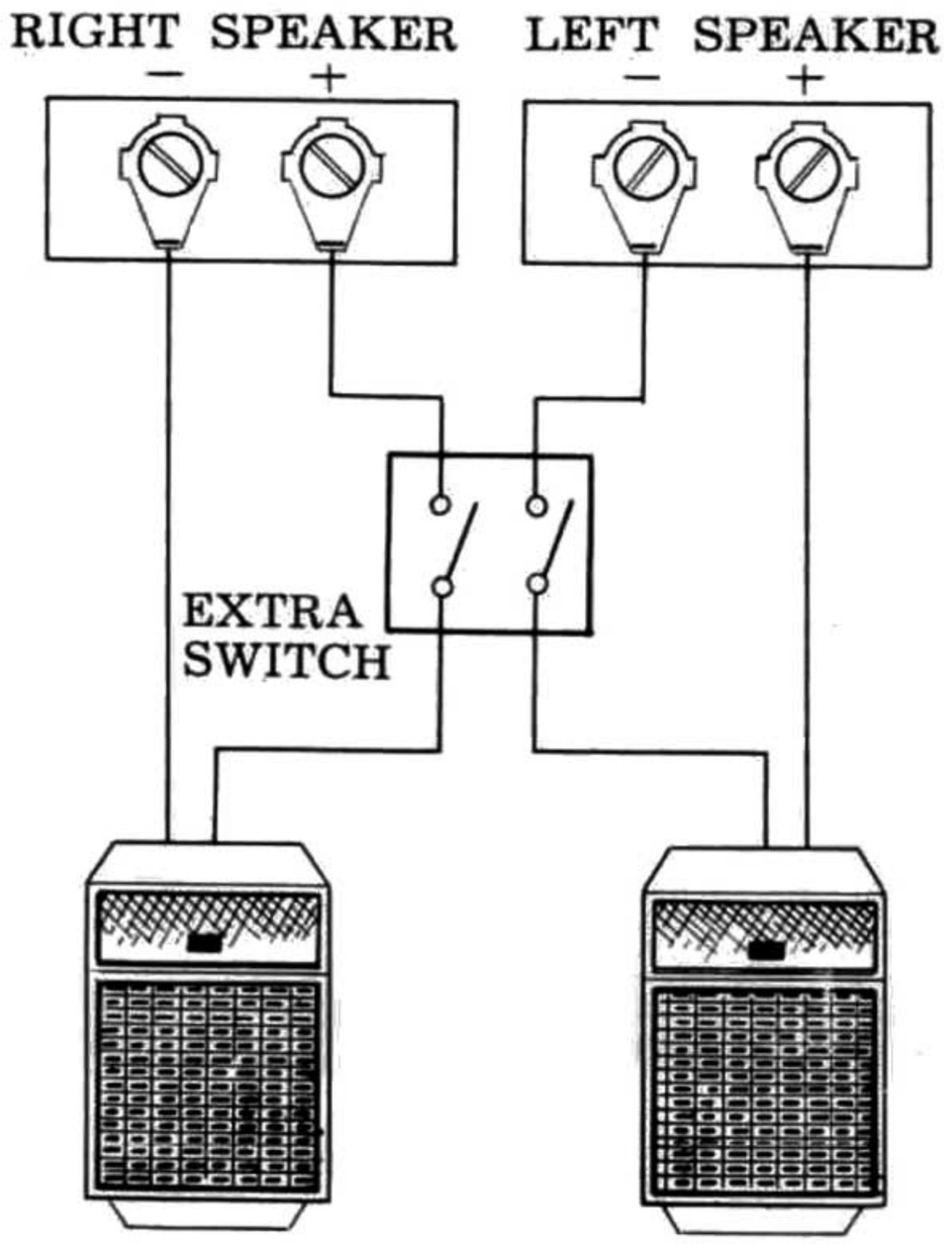


FIGURE 1.

3. ELECTRICAL CONNECTIONS

POWER

This switch has been set for operation from a 220 — 230 volt power source.

AM ANTENNA

In distant, weak reception areas, use of an outdoor antenna is recommended for best reception. Although there are regular, many-stranded antenna wires on the market, a strong vinyl covered copper wire will serve satisfactorily. Please consult the store where you purchased this unit, or a neighborhood radio shop concerning the erection of an outdoor antenna.

Inside a Concrete Structure — An outdoor antenna will be required even in areas close to a broadcasting station.

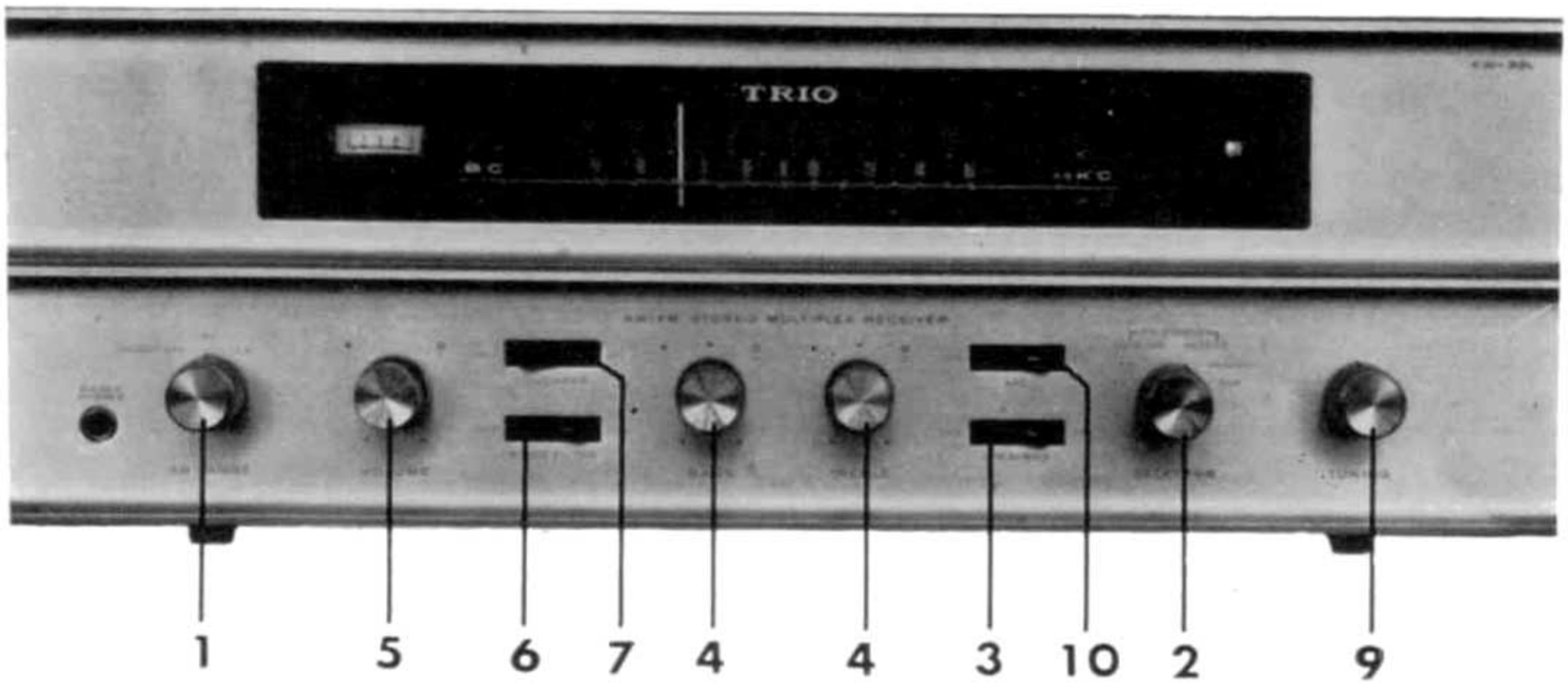
NOTE: Fluorescent lamps are sources of buzzing interference. Avoid running your lead-in wire close to them. This applies to lead-ins from both outdoor and indoor antennas.

FM ANTENNA

Two terminals are provided for connection to a 300 ohm FM antenna as shown in the interconnecting diagram.

For good FM stereo reception, always use the best antenna possible. In areas close to the transmitter, a simple indoor dipole antenna may suffice. It should be remembered, however, that the pick-up of reflections (similar to "ghosts" on TV) will result in poor stereo reception. These reflections must therefore be reduced to a minimum, either by careful orientation of the indoor antenna or, if this will not eliminate them, by using a more directional outdoor type.

In areas farther from the transmitter, the use of an outdoor antenna is highly recommended. These are available in various types. For reception of stations scattered in many directions, a non-directional type may be required. If the desired stations lie mostly in one direction, a highly directional type of antenna will provide best results. When using a directional antenna, always orient it for best reception of the desired station. The correct position will be indicated by maximum deflection of the tuning meter on the receiver.



4. CONTROLS AND THEIR FUNCTIONS

1) POWER

This is the power switch. BC or LW position supplies power while POWER OFF position cuts power.

BC — Tune station with TUNING knob. Station is properly tuned in when needle of the tuning meter deflects towards the black sector of tuning meter.

LW — Tune station with TUNING knob. Station is properly tuned in when needle of the tuning meter deflects towards the black sector of tuning meter.

2) SELECTOR

This switch selects the program source. In detail, each position does the following:

AM — Selects the output of the BC or LW tuner section for reproduction through the amplifier.

FM — Selects the output of the FM tuner section for reproduction through the amplifier.

MONITOR — When the selector is tuned to MONITOR position, a red light appears on the right side of the dial window indicating the receiver is now ready to monitor FM stereo broadcasts.

RECEIVE — After selecting the FM stereo broadcast of your choice with the selector placed at MONITOR position, you then turn the selector to RECEIVE position. This then changes the red light to green on the right side of the dial window which indicates the receiver's special multiplex circuitry is now switched on to produce stereophonic sound through the left and right channels.

Note: STEREO and MONITOR pilot lamps are provided on the dial face. The former lights up when the SELECTOR switch is in RECEIVE position. The latter will light when the SELECTOR switch is in MONITOR position.

PHONO — Selects sources connected to MAG and XTAL input jacks and it is therefore not desirable to have equipment connected to both pairs of jacks at the same time.

AUX — Selects sources connected to the AUX input jacks.

3) SPEAKERS

This switch should normally be in ON position. When listening through headphones, turn SPEAKER switch to OFF position.

4) BASS and TREBLE

These controls provide over all tone control, either increasing or decreasing the relative level of the bass and treble frequencies. When the indicators on the knobs are set at vertical position (12 o'clock), the amplifier is at its medium response. Clockwise rotation increases bass or treble response, and counter-clock rotation provides a reduction.

This Tone-Control is of friction type which allows left and right channels to be adjusted separately. When each channel has been set to the same tone level, simultaneous control of both channels can be accomplished.

5) VOLUME

This is a dual concentric friction-type control which permits the volume of both channels to be adjusted simultaneously. However, by holding one knob firmly, the other may be rotated separately, thus providing individual control of the volume of each channel. This permits the output of each channel to be balanced, or made equal in level. The large diameter panel knob controls the left channel, and the smaller outer knob controls the right channel.

6) NOISE FILTER

This switch inserts a filter into the circuit and reduces the high-frequency noise.

7) LOUDNESS

This switch provides the frequency response change (bass and treble boost) required by the ear at low listening levels, and permits the VOLUME control to function as a compensated loudness control.

8) SPEAKER PHASE

Speaker phase switch is located on the rear of the chassis. This switch is used to ensure correct phasing of the loudspeakers in the event that, during connection, the two speakers were connected out of phase. (See "Phasing of Loudspeakers")

9) TUNING

Tuning for either AM or FM is carried out with the single control designated TUNING. Always tune for maximum deflection of the tuning meter.

10) AFC

The FM tuner section incorporates an effective AFC (Automatic Frequency Control) circuit which ensures proper tuning even if the manual tuning has not been accurately carried out. By tuning on the AFC switch, the tuner section will automatically lock-in the station for best possible reception when the dial setting is close to the desired station. In addition, AFC will counteract any tendency on the part of the tuner to drift away from the frequency tuned in and thus prevent the need for manual retuning.

However, AFC should not be used to compensate for inaccurate or hurried initial tuning. Station selection must be carried out with the AFC switch in its OFF position, carefully tuning for maximum deflection of the tuning meter. Thereafter, AFC may be applied to counteract any slight drift that might occur.

Certain conditions may prevail however, which make the use of AFC undesirable. For example, applying AFC when tuning in a weak station which is adjacent to a strong one may cause the tuning to be pulled towards the stronger station. For optimum reception of a weak station which is adjacent to a strong one, the AFC switch should therefore be left in the OFF position.

5. OPERATING INSTRUCTIONS

Before operating the stereo receiver make sure you have connected your loudspeakers and any other associated equipment (record player, tape recorder, etc.). Initially, set BASS and TREBLE controls to their mid-positions, VOLUME to minimum.

AM (BC OR LW) OR FM OPERATION

To start the receiver, turn the AM RANGE switch to BC or LW. Set SELECTOR switch to AM or FM. Sound will be heard through both speakers. Adjust VOLUME control as necessary

and tune in desired station.

FM STEREO OPERATION

Set SELECTOR switch to MONITOR. Reception is possible only when FM stereo stations are tuned in. After locating the broadcast of your choice, then turn the selector to RECEIVE position.

Note: The volume of sounds you hear at MONITOR position is remarkably small, because the unit is receiving only on FM subchannel.

6. BALANCING CHANNELS

PHASING OF THE LOUDSPEAKERS

Correct phasing is important in a stereophonic system. If speakers are out of phase, they will work in opposition to each other and there will be a noticeable loss in low frequencies. Use the following procedure to make this adjustment:

a) Set SELECTOR to PHONO. Set VOLUME for desirable listening level.

b) Play a record containing heavy bass passages and adjust the BALANCE control (= Volume Control) for approximately equal output from both speakers.

c) Set the PHASE switch first to one position, then to the other, listening carefully to the bass tones in each position. Leave the switch in the position where the greatest amount of bass is heard in the general area between the two speakers.

REDUCING HUM

The hum balance control at the rear of the receiver will enable you to minimize any hum that may originate from the unit during normal operation. The procedure outlined below should be carried out with a turntable or record changer connected to this unit.

a) With the pick-up arm at rest, set SELECTOR to PHONO, VOLUME control to maximum, BASS and TREBLE to their midway or "flat" position, and all other switches set for normal stereo operation.

b) Using a screwdriver, adjust the HUM BALANCE control for minimum hum from both speakers.

AC LINE CORDS

As a general means of reducing hum, the following procedure should be carried out:

1. Turn on all equipment connected to the receiver.

2. Reverse the AC wall plug from the receiver to determine which position provides the least hum. Leave in this position.

3. Repeat this procedure with the AC plugs of the other components, using the selector switch to select the component being tested.

Making a single ground connection between the receiver and a ground point (such as the AC socket wall plate) may further reduce hum. The ground wire should be taken to a point as close to the input jacks as possible.

FUSE

The stereo receiver is fused in the AC primary to prevent damage of tubes and components. The value of the fuse is 2 amperes. In the event of its failure, this fuse should be replaced with one of the same rating. Replacing with a fuse of a higher rating will not protect the receiver and may cause severe damage.

PHONO OPERATION

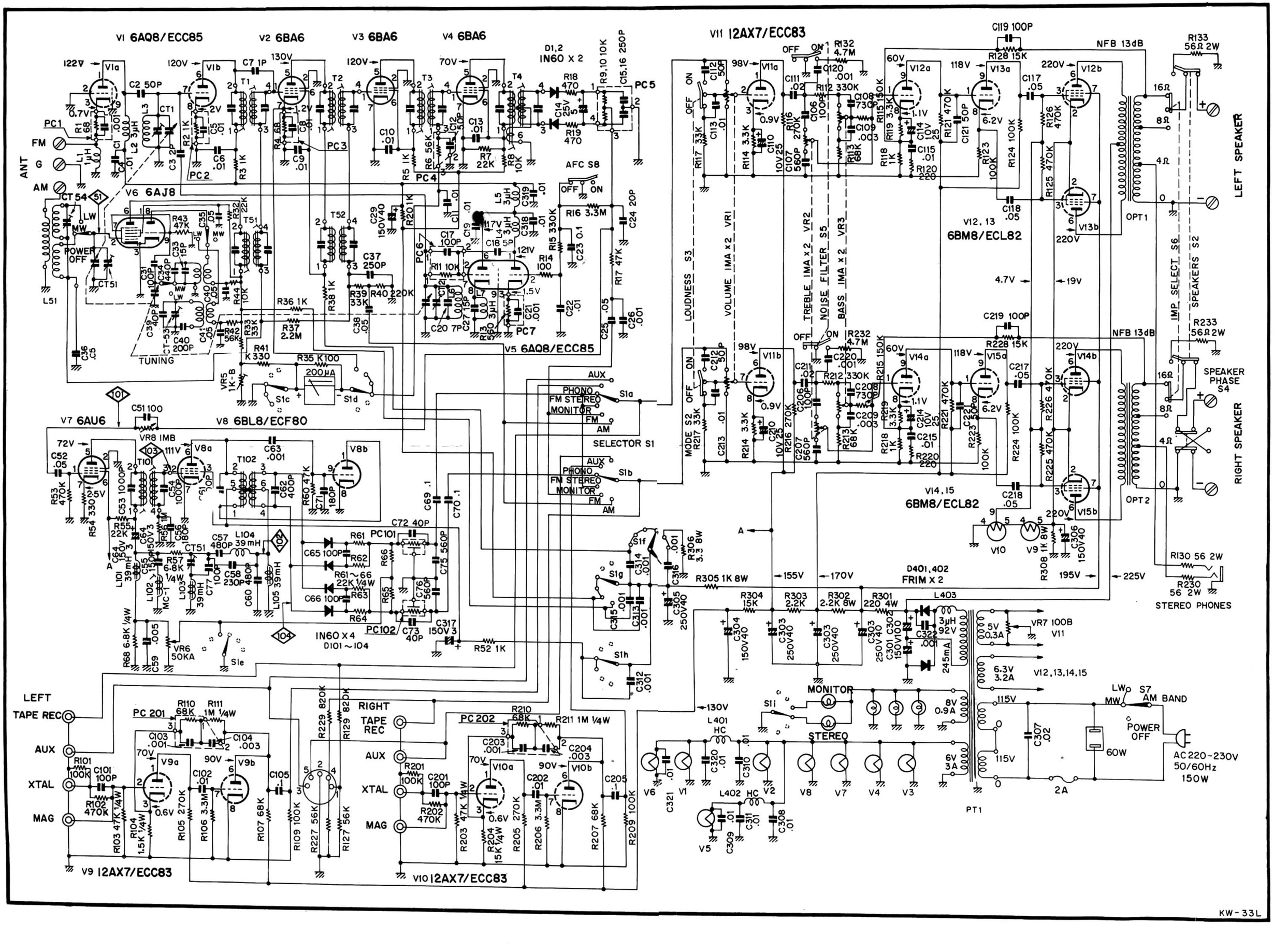
STEREO — Set SELECTOR to PHONO. Adjust all other controls as necessary for proper stereo operation.

MONOPHONIC RECORD PLAYERS — Set SELECTOR to PHONO, depending on whether the monophonic record player is plugged into the LEFT or RIGHT phono input jack. The program source will now be heard through both speakers.

7. SPECIFICATIONS

Tubes and Diodes Used:	15 tubes and 8 diodes 6BA6 .... 3, 6BE6 .... 1, 6AU6 .... 1, 6BL8 .... 1, 6AQ8 .... 2, 12AX7 .... 3, 6BM8 .... 4, Germanium Diode .... 6, Silicon Diode .... 2.
Frequency Range:	FM ; 88 — 108 MHz BC ; 520 — 1610 KHz LW; 150 — 350 KHz
Sensitivity:	FM ; 2 microvolts/98 MHz (Input required for S/N 20 db) BC ; 10 microvolts/1000 KHz (Input required for S/N 10 db) LW; 10 microvolts/250 KHz (Input required for S/N 10 db)
Frequency Response:	20 — 20000 Hz ($\pm$½ db)
FM Stereo Separation:	More than 31 db (at 400 Hz)
FM Harmonic Distortion:	FM ; Less than 1% (at 400 Hz) FM Stereo ; Less than 1% (at 400 Hz)
SCA Rejection:	Better than 50 db
Inputs:	MAG — 1.5 mV, XTAL — 20 mV, AUX — 100 mV
Output Power:	28 watts total Music Power, 14 watts per channel
Hum and Noise:	PHONO 60 db, AUX 69 db (Below rated output Tone Control Flat)
Tone Control:	Bass: 50 Hz +10 db, – 10 db Treble: 10 KHz +10 db, – 10 db
Noise Filter:	– 10 db at 10 KHz
Loudness Control:	100 Hz +12 db, 10 KHz +4 db (Volume Control at – 30 db)
Special Circuit:	Noise Filter, Stereo Headset Jack, FM Stereo Monitor
Power Consumption:	AC 50 — 60 Hz 220 — 230 Volts 125 watts
Dimensions:	Width 16-1/2", Height 5-13/16", Depth 14".
Net Weight:	29 lbs.

SCHEMATIC DIAGRAM



KW-33L



TRIO

Manufactured by TRIO CORPORATION, TOKYO, JAPAN.

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