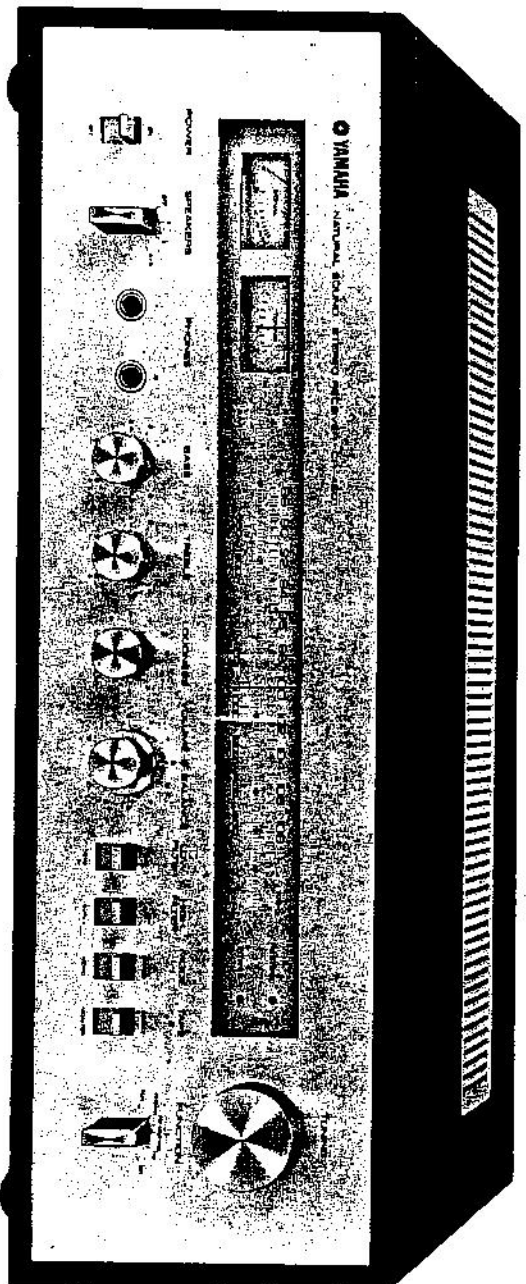


YAMAHA CR4150

Stereo FM/AM receiver

Owner's Manual

Pure complementary OCL circuitry
Three-stage direct coupled IC phono equalizer
Continuous Loudness control
Two headphone jacks



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Note: If you want to set up the system quickly, please see pages 10 & 11 showing the connection diagram.

Congratulations upon your selection of the Yamaha CR-450. The CR-450 incorporates some of the world's most advanced electronic technology, employing a special Yamaha design to provide outstanding performance and convenience for any program source.

The FM tuner boasts excellent sensitivity for weak signal areas. Yet assures outstanding clear signals in the city where many FM stations are close together on the dial scale.

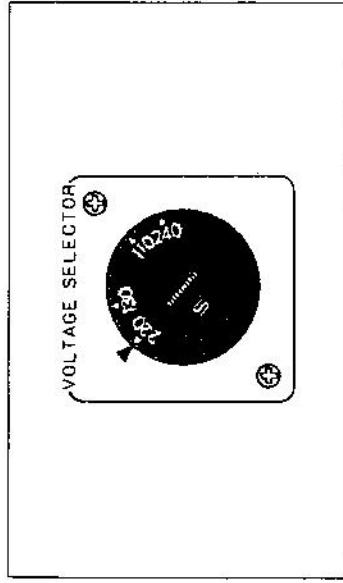
Brilliant, distortion-free response is yours from the record and tape playback sections, one of the reasons the CR-450 is an ideal choice for every music lover. For optimum performance and long years of listening pleasure, be sure to fully read this owner's manual and keep it handy for future reference.

PRECAUTIONS

For optimum performance and durability from your CR-450, pay careful attention to the following points.

- Do not place the set in a location exposed to direct sunlight or heat.
- Be sure to use the function and speaker switches as explained on the following pages. Do not exert undue force on any of the controls.
- Be sure to turn off the power switch when making any connections or disconnections. This is especially important when disconnecting speaker leads.
- Input connections should be touched only when the volume is turned all the way down or the power switched off.
- The cabinet is made of fine-quality wood. Do not clean it with thinner or other volatile products. If any such products, such as insecticide, fall on the cabinet, wipe it clean immediately.

If your set has a voltage selector, before you plug in the power cord check that the selector is set to your local current.
If not properly set, turn the knob and reset it to the correct position.
Voltage settings: 110, 130, 220, 240V (the 150, 260V settings are not connected).



U.S. & Canadian models are set for 117V, 60Hz.
These models have no voltage selector.

OTHER EQUIPMENT: CONNECTION AND OPERATION

SPEAKER SYSTEM CONNECTION AND OPERATION

1. There are two sets of speaker Terminals (A, B) on the rear panel, permitting the connection of two separate sets of speakers.

2. These terminals are controlled by the Speaker selector on the front panel. Set for A, B or both (A + B).

If the selector is set to OFF, no sound will be heard from any of the speakers; this is the position to use when listening through the headphones only. See Fig. 1.

3. Connect the left-hand speaker (viewed from the listening position) to the L terminals, the right-hand speakers to the R for both A and B sets. Be careful not to confuse the (+) and (-) terminals for each speaker, otherwise an out-of-phase signal will be produced, reducing stereo response.

4. These terminals are push-spring types. As shown in Fig. 2, first push back on the bottom lever of the terminal, then insert the stripped end of the lead and hold it in place while you release the lever. The red terminal are (+), the black (-).

Note: If 4 ohm speakers are used, only one set of speakers should be connected.

If two sets are connected and one or both are 4 ohm types, be extremely careful not to use the A + B speaker selector setting.

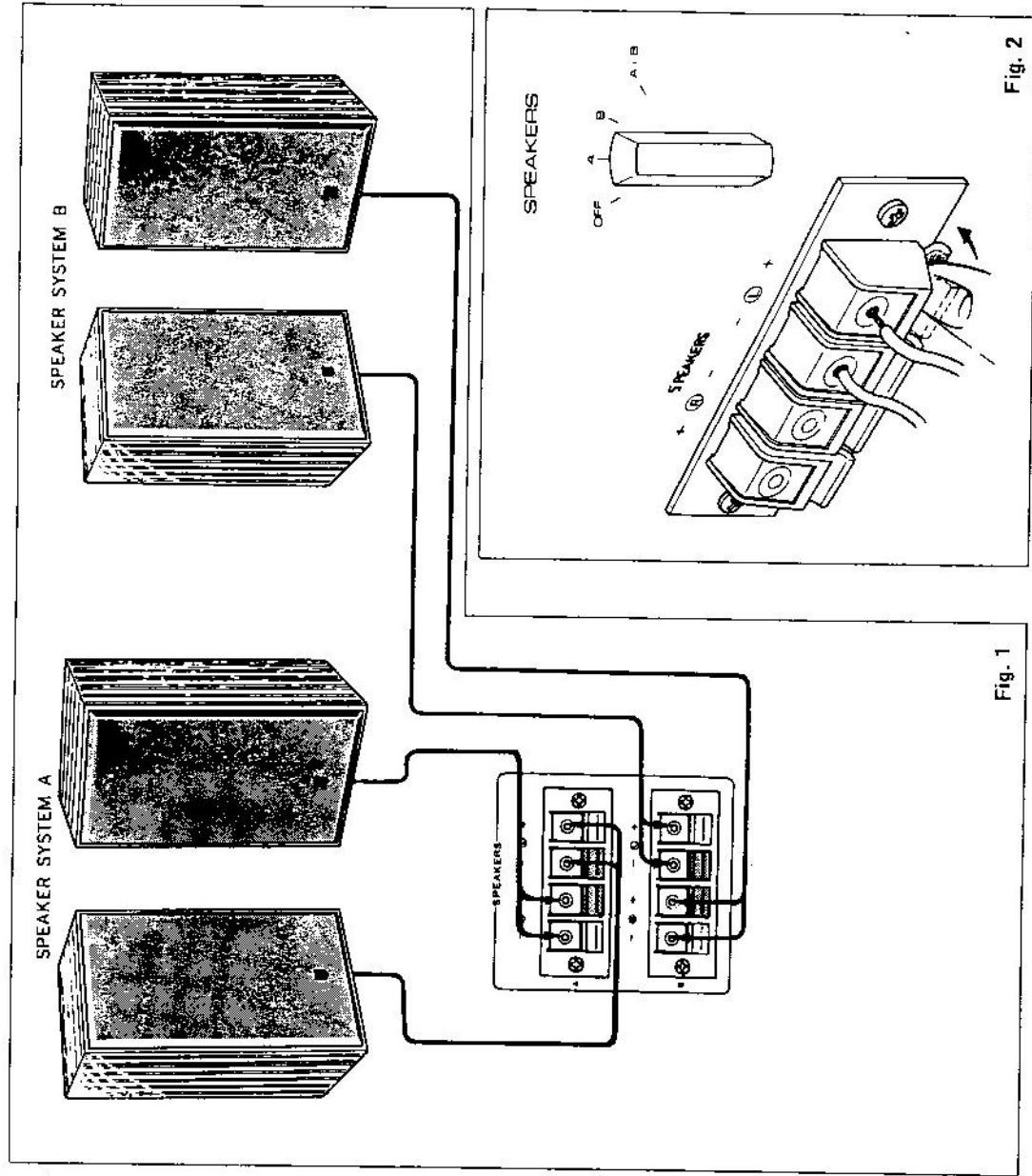


Fig. 1

Fig. 2

AM ANTENNA CONNECTION

A high-quality AM ferrite bar antenna is built into the rear panel. Under normal conditions AM reception should require this antenna only: tune in a strong station and then swing out the bar while watching the tuning meter to find the best angle (see Fig. 3) inside a ferroconcrete building or in a weak signal area where this antenna alone does not provide sufficient signal strength, an outdoor AM antenna must be installed. Connect it to the AM antenna terminal and set it up as shown in Fig. 4. Be sure to ground the set with the Gnd terminal at this time.

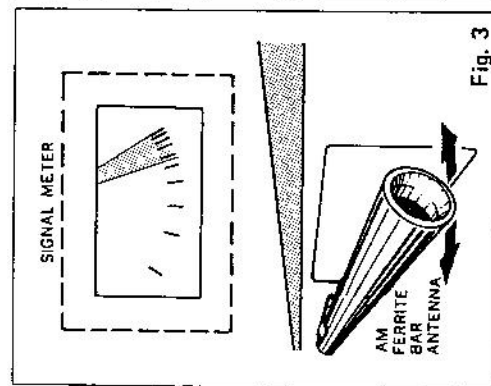


Fig. 3

AM BROADCAST RECEPTION

Set the Function selector to AM and gently tune in an AM station with the Tuning knob; as you approach the desired station watch the Signal meter for maximum deflection to the right. Tuning to this point will provide the best reception.

FM ANTENNA CONNECTION

A T-shaped FM ribbon antenna is included among the accessories. It should be adequate for reception of strong signals from local FM stations. Use the antenna terminals marked 300Ω on the back panel of the CR-450, as shown in Fig. 5. Tack the antenna to different walls or at different angles on the ceiling, choosing the orientation that gives the highest Signal Meter deflection for the stations of your choice. An external, directional antenna (like a television antenna) gives much better results with distant stations, particularly for FM stereo. The ultimate, of course, is a motorized directional antenna with remote control of orientation. Locate it as high as is convenient, and not unnecessarily remote from the CR-450 itself.

Many antennas have both 300Ω and 75Ω connections, although some have only the one. Connect the correct (300Ω or 75Ω) terminals on the CR-450 for your antenna. If you have a choice, the 75Ω connections should be used, always with coaxial cable, particularly if the antenna must be some way from the receiver. A 300Ω/75Ω transformer will enable you to use coaxial cable with a 300Ω antenna.

Connect the coaxial cable to the 75Ω terminals as shown in Fig. 6, ensuring that the inner conductor is connected to the terminal with the shield wire in contact with the clamp.

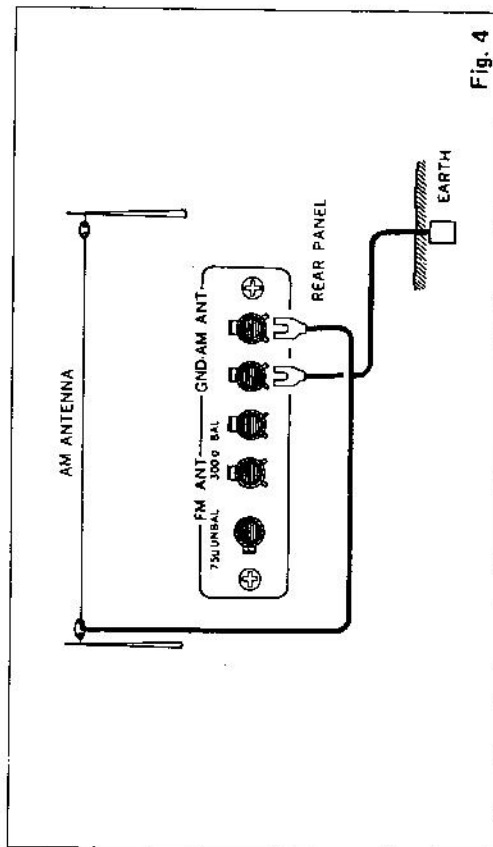


Fig. 4

FM BROADCAST RECEPTION

Set the Function selector to FM Muting or to FM, to switch on the FM tuner section. Then gently turn the Tuning knob until you find the desired station. Watch for maximum Signal meter needle deflection, and then finish the tuning by adjusting the Tuning knob so that the Tuning meter needle is at its central position. This position will provide best reception for that station, if the Function selector is set to FM Muting during tuning this will cut out all FM hiss and noise between FM stations, and can block weak incoming signals. For this reason, do not use it when tuning in a weak station, or in a weak signal area.

There is no setting for FM Stereo; if a stereo broadcast is received the CR-450 automatically switches to stereo mode, and the stereo lamp lights. The lamp does not light during reception of monophonic signals.

Even with the best of antennas, if you are distant from the station or in a weak signal area one or more FM stereo signals will be accompanied by a great deal of FM noise. In this case, flick the Mode selector switch down to Mono. You will lose the stereo effect, but the noise will be greatly reduced. In normal FM listening conditions the Mode switch should be left on Stereo. See Fig. 9.

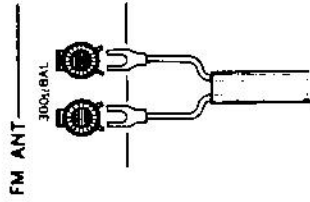


Fig. 5

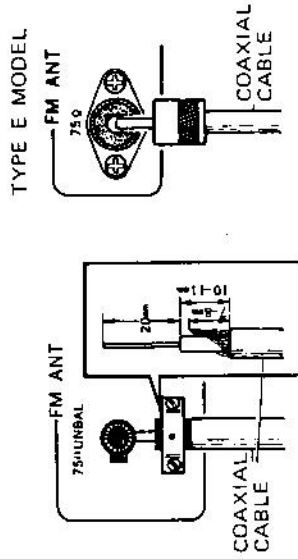


Fig. 6

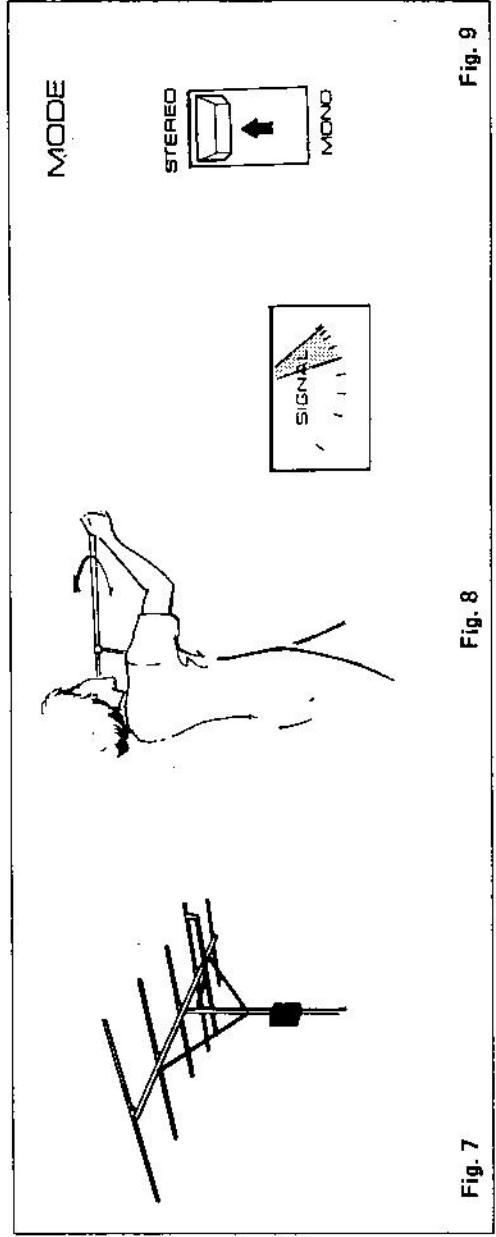


Fig. 8

Fig. 7

Fig. 9

RECORD PLAYER CONNECTION AND OPERATION

Connect the pin plug from the record player to the Phono jacks. Be careful not to confuse the left and right leads; the red lead is usually the right channel signal, the white (or grey) the left.

Then connect the record player ground wire to the Gnd terminal at the left of these jacks (see Fig. 10). Now, when the Function selector is set to Phono the record player connected to these jacks can be used as a signal source.

FUNCTION

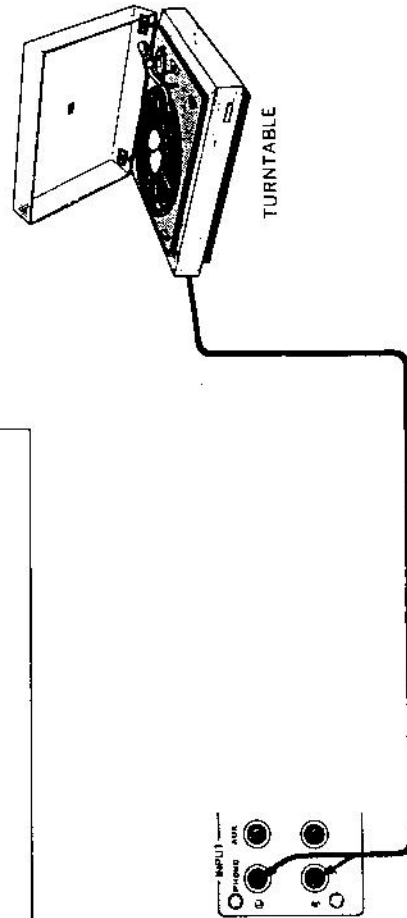
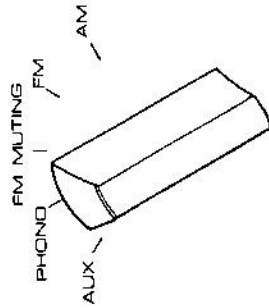


Fig. 10

TAPE DECK CONNECTION AND OPERATION

Connect the Tape Rec Out jacks on the rear panel to the tape deck Line In jacks; then connect the Tape PB jacks to the Line Out jacks on the same deck. Be careful not to confuse the left and right leads.

TAPE PLAYBACK

Set the tape switch to Monitor and set the controls on the deck for playback.

Note:

When listening to a program source selected by the Function selector, be sure the Tape switch is set to Source. If it is set to Monitor no sound will be heard.

RECORDING

Set the Tape switch to Source, then you can record onto the tape deck connected to the Rec Out jacks. You can record any program selected by the Function selector.

AUXILIARY INPUT CONNECTION AND OPERATION

The Aux jacks on the rear panel are for connecting other sound source equipment such as an 8-track cartridge player, television with audio output jack, or other tuner. If the connected unit is monophonic, connect to the left (L) jack only, and set the Mode switch to Mono. Use these jacks instead of the Phono jacks for connecting a turntable with a crystal or ceramic cartridge. Be sure to set the Function switch to Aux when listening to any unit connected to these jacks. See Fig. 11.

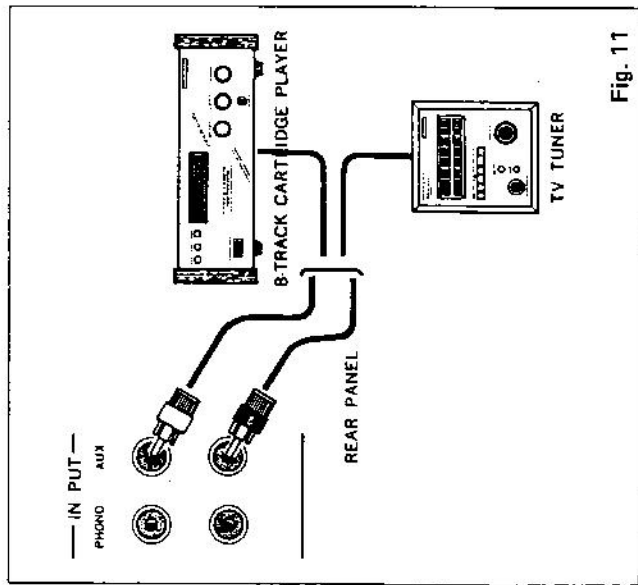


Fig. 11

HEADPHONE CONNECTION AND OPERATION

To use one or two headphone sets, plug each headphone into the jack on the front panel. This does not turn off the speakers automatically; if you want to listen privately through the headphones, set the Speaker selector switch to Off (Fig. 12).

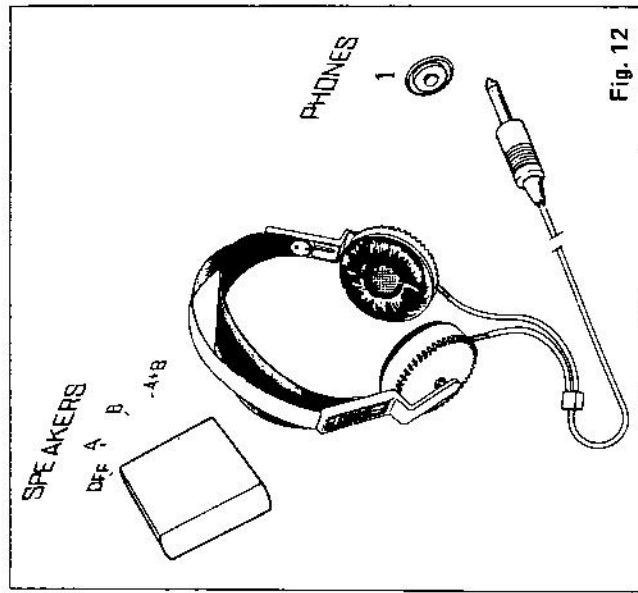


Fig. 12

ACCESSORIES

- Service Pads
Use the service pads to protect the upper panel of the CR-450 when another unit is placed on it. Peel off the tape and stick a pad to each foot of the other unit before placing it on top of the CR-450. See Fig. 13.
- Hexagonal Wrench
Use this wrench to loosen the Function and Speaker selectors if their settings do not match the indicated markings on the panel.

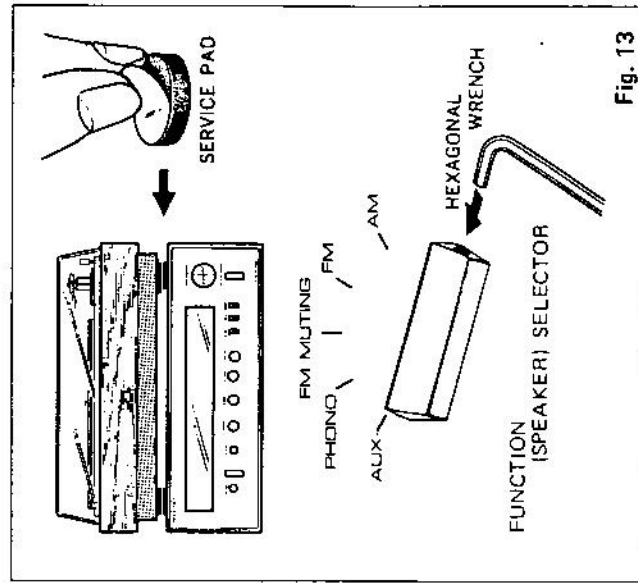
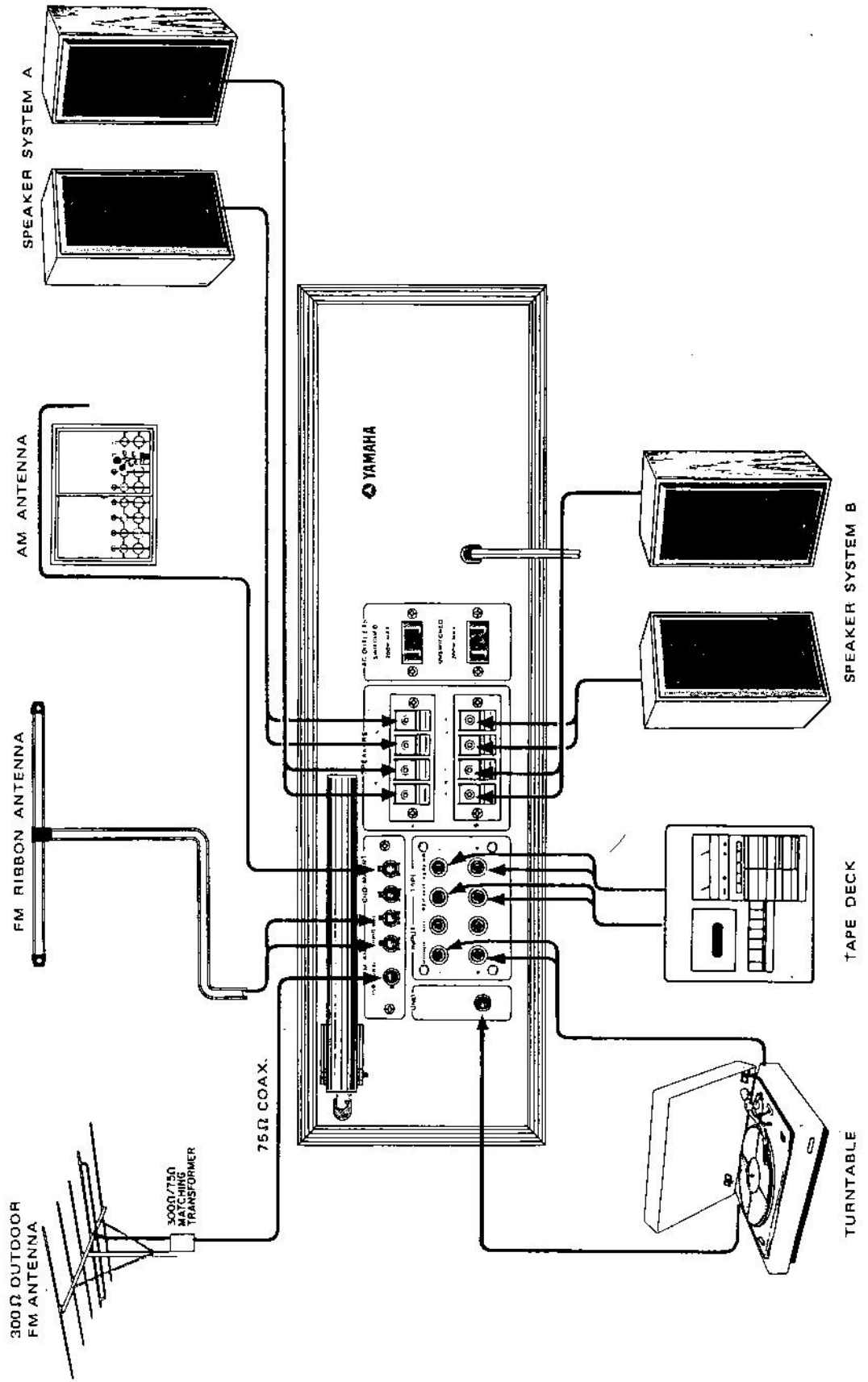


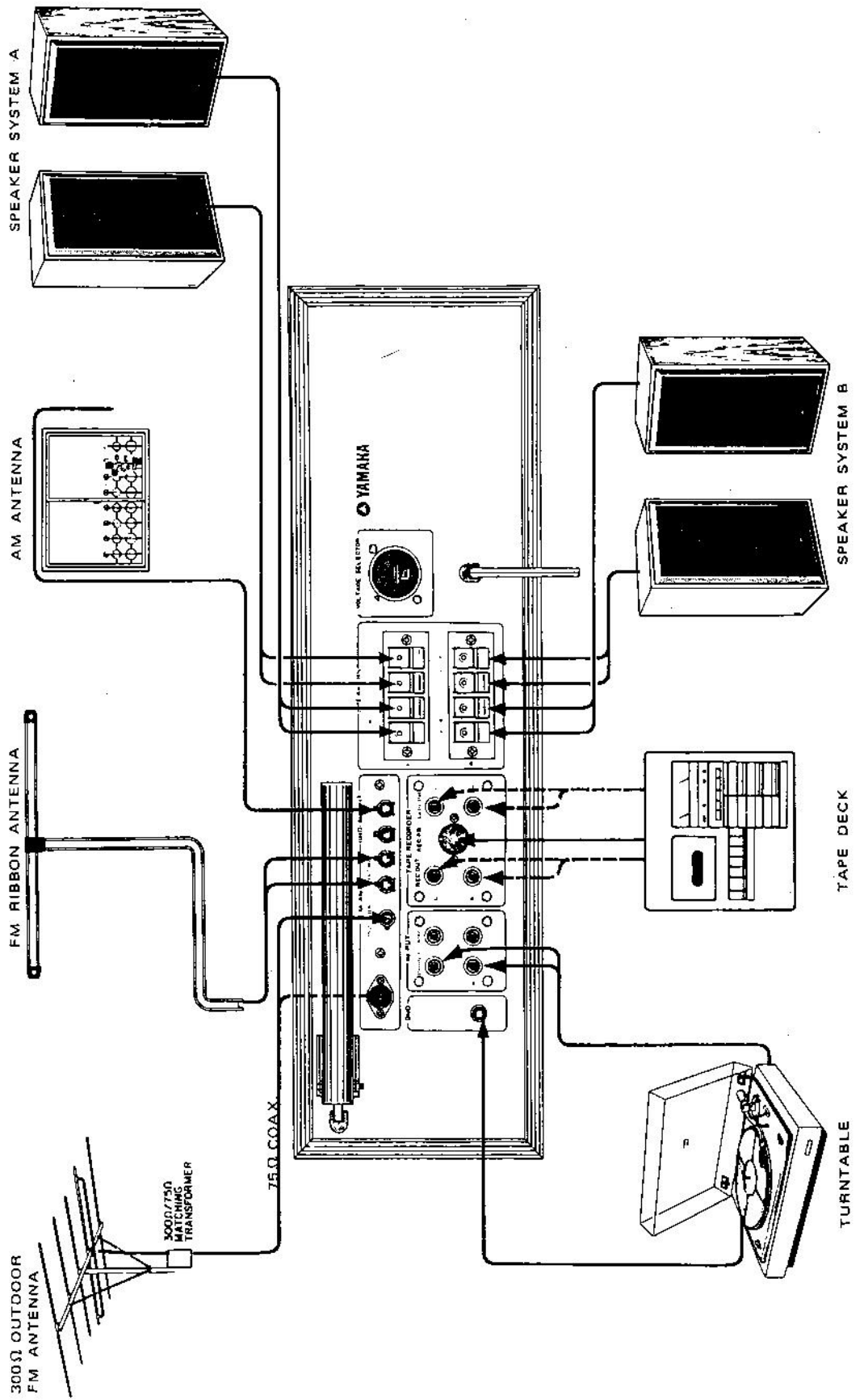
Fig. 13

CONNECTION DIAGRAM

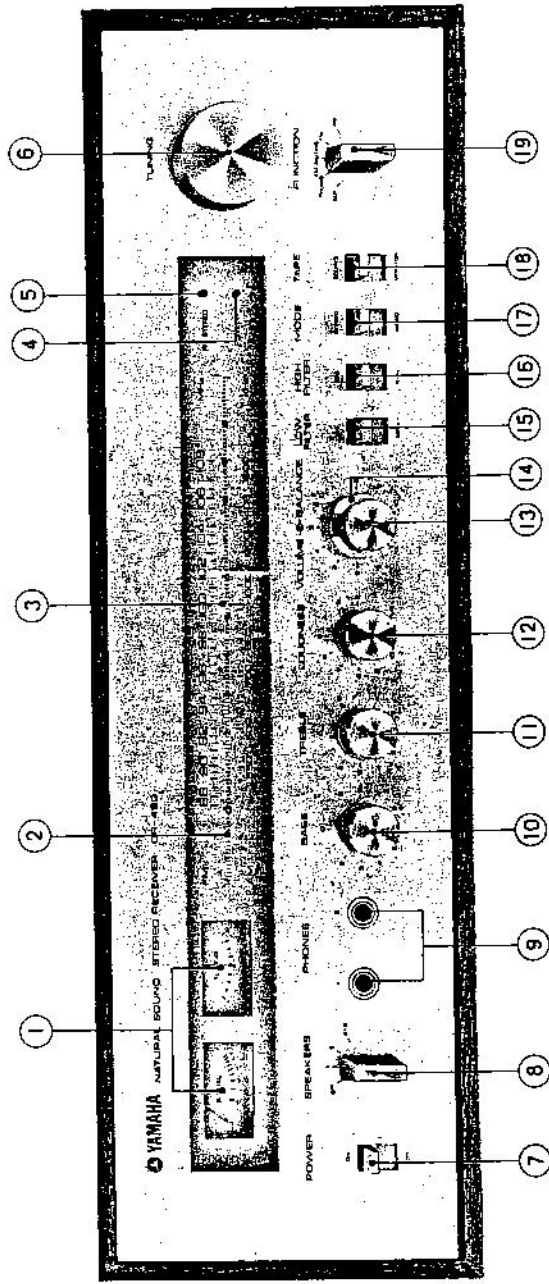
MODELS OTHER THAN TYPE E



TYPE E MODEL



FRONT PANEL PARTS AND FUNCTIONS



1 SIGNAL AND TUNING METERS

These meters can be used to indicate when you have achieved perfect tuning for a particular radio station. Both meters are used for FM broadcasts, while the Signal meter alone is used for AM. If the signal meter needle does not swing past 20 this shows that the incoming signal for that station is probably not strong enough for top quality reception. See the antenna connection explanations, p. 6-7.

2 DIAL

Shows the frequency of the incoming radio signal. The upper portion is for FM, the lower for AM.

3

Moves when the Tuning knob is turned. The middle red line indicates the frequency of the FM or AM station received.

4

Lights up when the unit is receiving power through the power switch.

5

When an FM stereo program is received the set will automatically switch to stereo performance and this lamp will light. When a monophonic station is tuned, the set will play in mono and this lamp will go out.

6 DIAL INDICATOR

Moves when the Tuning knob is turned. The middle red line indicates the frequency of the FM or AM station received.

7 POWER LAMP

Lights up when the unit is receiving power through the power switch.

8 FM STEREO INDICATOR

When an FM stereo program is received the set will automatically switch to stereo performance and this lamp will light. When a monophonic station is tuned, the set will play in mono and this lamp will go out.

9 TUNING KNOB

Use this knob to tune in an FM or AM station while watching the Tuning and Signal meters. Turn the knob slowly.

10 POWER SWITCH

Use it to switch on the set.

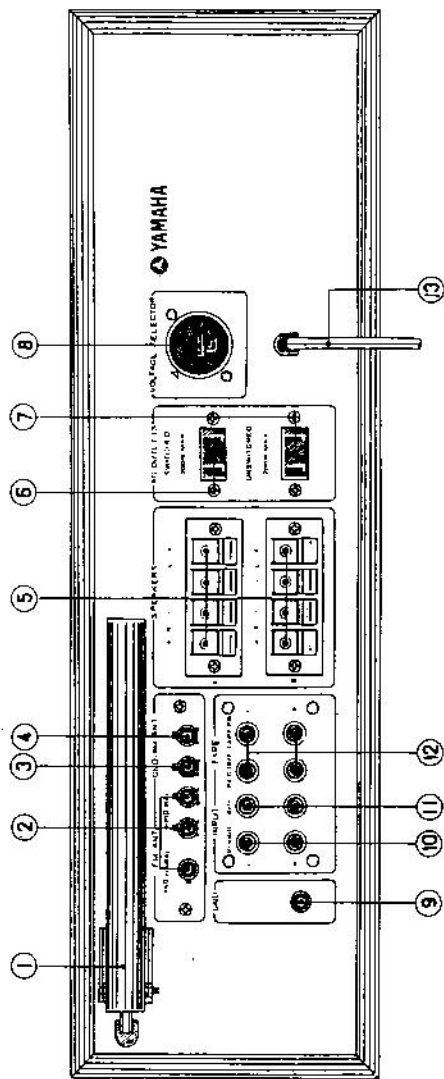
11 SPEAKER SELECTOR SWITCH

Use this switch to select either or both of the speaker systems (A, B), connected to the rear panel terminal (see p. 5 for details).

- ⑨ HEADPHONE JACKS**
Plug in one or two headphone sets here for private listening (see p. 9).
- ⑩ BASS CONTROL**
Adjusts the bass tones. From the 0 position turn to the right to strengthen bass tones, turn to the left to diminish them. For normal listening, leave the knob set at 0 (see p. 17).
- ⑪ TREBLE CONTROL**
Adjusts the treble tones. From the 0 position turn to the right to strengthen treble tones, turn to the left to diminish them. For normal listening, leave the knob set at 0 (see p. 17).
- ⑫ LOUDNESS CONTROL**
During low-volume listening the ear's sensitivity to high and low tones is greatly reduced. This control incorporates a unique Yamaha circuit permitting you to readjust the balance for full listening pleasure, even late at night when the sound must be kept low (see p. 18).
- ⑬ VOLUME CONTROL**
This knob controls the overall volume coming from the speakers. Turn to the right to increase the volume. Turn the volume down (all the way to the left) when turning on the power or changing the Function selector or Speaker selector setting (see p. 17).
- ⑭ BALANCE CONTROL**
This knob controls the relative strengths of the left and right channels. The strength of both channel signals are even when the knob is set at 5. Turn to the right to diminish the left channel volume, to the left to diminish the right.
- ⑮ LOW FILTER SWITCH**
Cuts all frequencies below 50Hz (see p. 18).
- ⑯ HIGH FILTER SWITCH**
Cuts all frequencies above 8kHz (see p. 18).
- ⑰ MODE SWITCH**
Lets you select between stereo and monophonic performance according to the program source. If a signal is being heard through only one channel, set this switch to Mono and it will be heard through both sides.
- ⑱ TAPE MONITOR SWITCH**
This is for monitoring the sound from a tape deck connected to the Tape recording and playback jacks on the rear panel. For tape play set this switch to Monitor. In addition, if the tape deck is a three-head type, you can monitor even while you are recording.
- ⑲ FUNCTION SWITCH**
Use this switch to select the program source.
AUX See p. 9.
PHONO See p. 8.
FM MUTING See p. 7.
FM See p. 7.
AM See p. 6.

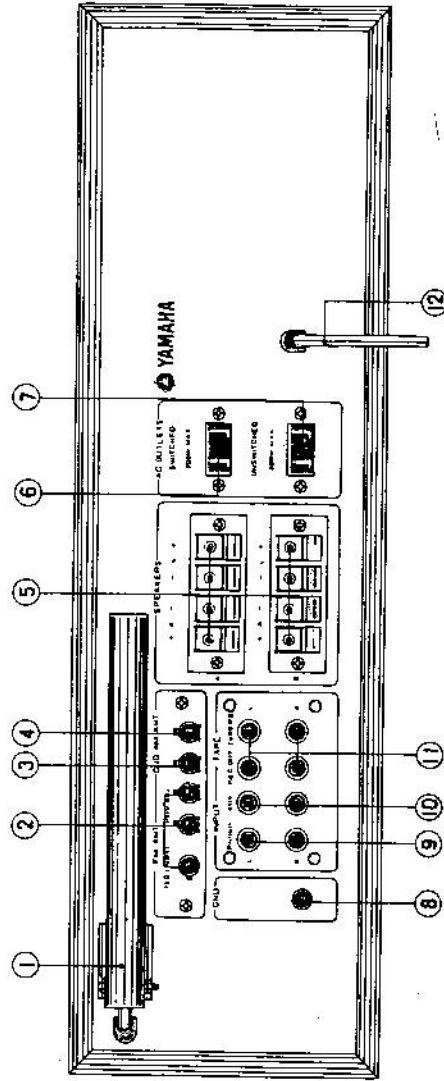
REAR PANEL PARTS AND FUNCTIONS

• TYPE A MODEL



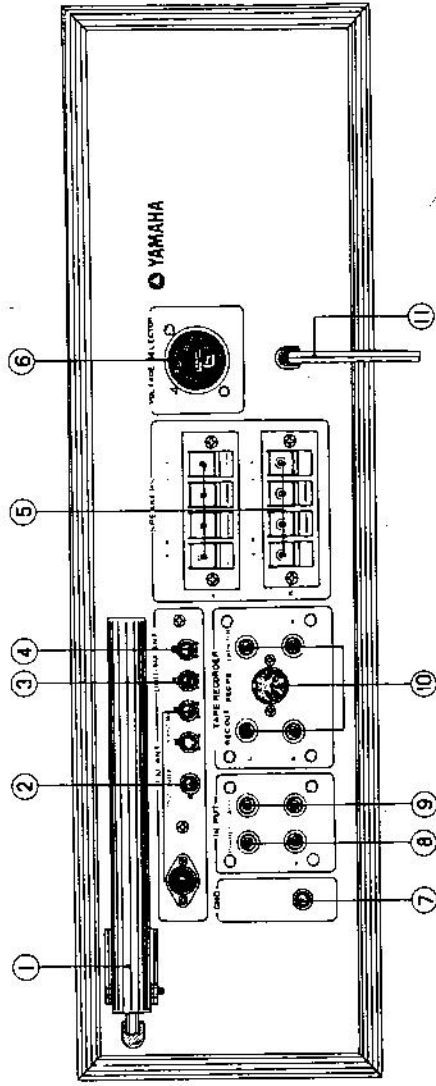
- ① AM FERRITE BAR ANTENNA
- ② FM ANTENNA TERMINALS (see p. 6~7)
- ③ GROUND TERMINAL (see p. 6)
- ④ AM ANTENNA TERMINAL (see p. 6)
- ⑤ SPEAKER TERMINALS (see p. 5)
- ⑥ AC OUTLET — SWITCHED
Provides AC power only when the CR-450 power switch is on.
- ⑦ AC OUTLET — UNSWITCHED
Provides AC power when the CR-450 power cord is plugged in, regardless of whether the power switch is on or off.
- ⑧ VOLTAGE SELECTOR
Set it to match the voltage in your area.
- ⑨ GROUND TERMINAL (see p. 8)
- ⑩ PHONO JACKS (see p. 8)
- ⑪ AUX JACKS (see p. 9)
- ⑫ TAPE RECORDING/PLAYBACK JACKS (see p. 8~9)
- ⑬ AC CORD

• **TYPE B MODEL**
(U.S. & CANADIAN MODEL)



- ① AM FERRITE BAR ANTENNA
- ② FM ANTENNA TERMINALS (see p. 6~7)
- ③ GROUND TERMINAL (see p. 6)
- ④ AM ANTENNA TERMINAL (see p. 6)
- ⑤ SPEAKER TERMINALS (see p. 5)
- ⑥ AC OUTLET — SWITCHED
Provides AC power only when the CR-450 power is switched on.
- ⑦ AC OUTLET — UNSWITCHED
Provides AC power when the CR-450 power cord is plugged in, regardless of whether the power switch is on or off.
- ⑧ TUNER DISPLAY
- ⑨ TAPE DECK
- ⑩ CASSETTE DECK
- ⑪ GROUND TERMINAL (see p. 8)
- ⑫ AC CORD

● TYPE E MODEL



- | | | | |
|---|-----------------------------------|---|---|
| ① | AM FERRITE BAR ANTENNA | ⑦ | GROUND TERMINAL (see p. 8) |
| ② | FM ANTENNA TERMINALS (see p. 6~7) | ⑧ | PHONO JACKS (see p. 8) |
| ③ | GROUND TERMINAL (see p. 6) | ⑨ | AUX JACKS (see p. 9) |
| ④ | AM ANTENNA TERMINAL (see p. 6) | ⑩ | TAPE RECORDING/PLAYBACK JACKS
(see p. 8~9) |
| ⑤ | SPEAKER TERMINALS (see p. 5) | ⑪ | AC CORD |
| ⑥ | VOLTAGE SELECTOR | | |

Set it to match the voltage in your area.

EXPLANATIONS OF CONTROLS AND CONNECTIONS

VOLUME, BALANCE CONTROL

This is a two-part control. The inner portion is used to adjust the volume; turn to the right to increase the volume level.

The outer portion is used to adjust the left and right channel balance. When set to its middle position, both channels are equally strong. Turn to the right and the left speaker is diminished, turn to the right and the sound from the left is diminished. To check the balance first play a monophonic signal, then adjust so that when you are in the listening position the sound seems to be coming from a point midway between the speakers. See Fig. 14.

VOLUME \odot -BALANCE

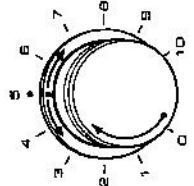


Fig. 14

TRIMMEABLE TONE CONTROLS

In addition to adjusting the sound quality to match your listening tastes for any particular song, the tone controls can also be used in the following ways. If a program source is filled with high-frequency distortion or noise, turn the Treble control down (to the left) past the 0 mark to reduce this distortion. By the same token, if you are troubled at any time by

low-frequency noise or distortion, turn the Bass control down from 0 to reduce the problem. However, if the noise or distortion is so bad that you are forced to turn the control too far to the left, it will result in reduced musical response and listening pleasure. For this reason, be moderate in your use of these controls to cancel noise and distortion. The tone controls are also useful for adjusting the bass and treble tone to match the characteristics (live or dead) of your listening room. See Fig. 15.

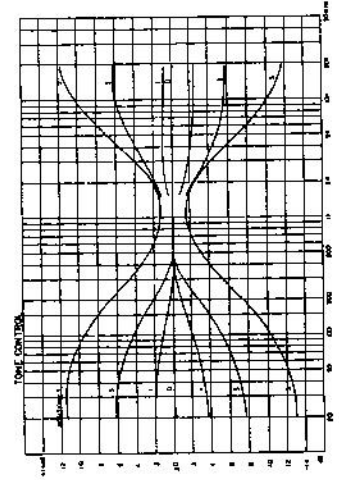


Fig. 15

LOUDNESS CONTROL

At very low volume listening levels the ear's sensitivity to bass and treble tones becomes very poor. The Loudness control helps to compensate for this phenomenon.

With the special continuous Loudness control on the CR-450 you can adjust the effect to match your personal listening preferences.

First set the Loudness control to Flat. In this position the effect does not work at all.

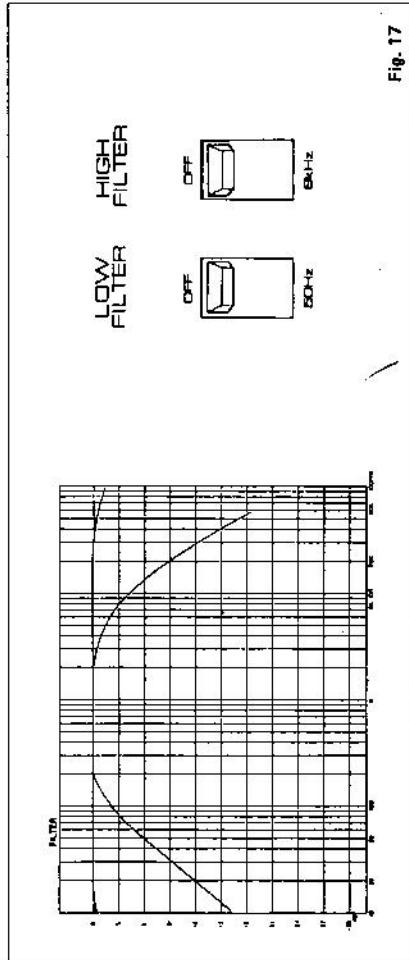
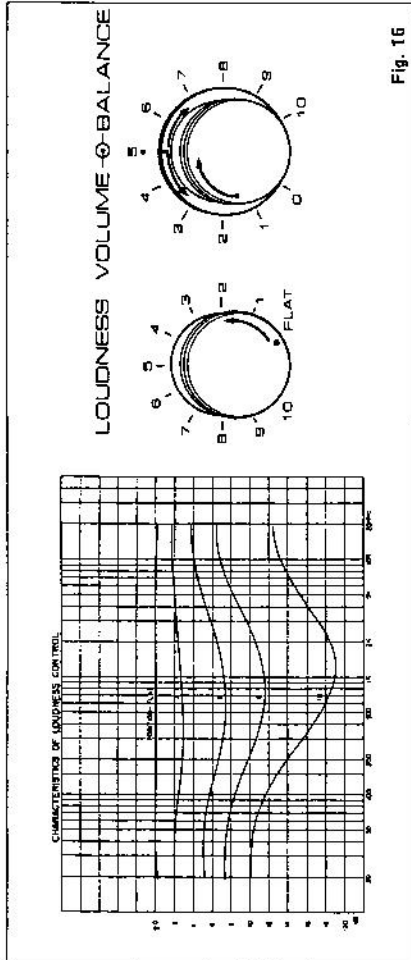
Next set the Volume control to the loudest level you expect to use. Now you can turn the volume down by turning the Loudness control to the left, and at the same time preserve the same acoustic balance (see Fig. 16). In this way you have in fact tailored the Loudness control to the volume range that best suits your ear.

FILTER SWITCHES

To cut out low and high frequency distortion and noise the CR-450 incorporates a low and a high filter. The low filter is useful for cancelling record player motor rumble; it reduces all frequencies below 50Hz by 6 dB/oct.

The high filter works to reduce record scratch noise and radio hiss by cutting all frequencies above 8kHz by 6dB/oct.

With either of these switches set to Off the filter is not operating (see Fig. 17).



DO NOT BE ALARMED IF

If the unit does not seem to be functioning properly, consult the following chart and make the proper checks. If it still does not work right, contact your Yamaha serviceman.

PROBLEM	CAUSE	CORRECTION
No power when the switch turned on.	Cord not plugged in. Plug not firmly inserted. Primary fuse blown.	Plug in. Push in firmly. Replace with 3.0A (Type E Model: 3.15A) fuse or contact serviceman.
Power is on, but no sound.	Improper speaker connection. Speaker selector switch set to OFF. Tape monitor switch set to Monitor. Improper function selector switch setting. Volume turned too low.	Recheck connections. Turn to A, B or A+B. Set to Source. Set to proper program source. Turn up.
No sound from one channel.	Improper speaker connection. Defective input jack connection. Improper left-right balance setting. Playback from mono tape recorder.	Recheck connections. Recheck connections. Line up red marks on volume knobs. Set mode switch to Mono.
FM Stereo indicator flashes during FM stereo reception.	Improper tuning.	Retune.
Noise during FM stereo reception.	Improper antenna or weak signal. A clear FM stereo signal can be received only to within a distance about half that for an FM mono signal.	Check antenna connections. Replace ribbon antenna with more powerful outdoor type. Install more sensitive antenna. Listen in mono mode.
Strange hissing or beeping during FM reception.	Interference from auto or motorcycle ignition.	Make sure to connect antenna with a coaxial cable. Move the antenna farther from the street.
Hum when playing records.	Player ground wire disconnected. Improper positioning of player and/or amp. Improper phono connections.	Reconnect firmly. Reposition the units on solid bases. Reconnect firmly.
Sound distortion during record play.	Worn stylus. Improper stylus. Dirty stylus.	Replace. Replace with one that matches the cartridge. Clean.
Howling (a resonant 'booming' sound) while playing records, when volume is high.	Speakers too close to record player.	Separate player and speakers as far as possible. Put a soft, vibration-dampening material under the player. Do not place the speaker(s) and player on the same shell, table-top, etc.

SPECIFICATIONS

AUDIO SECTION

Min. RMS Output Power per Channel
25 watts (8 ohms) from 20Hz to 20,000Hz at no
more than 0.1% Total Harmonic Distortion
30 watts (4 ohms) from 20Hz to 20,000Hz at no
more than 0.1% Total Harmonic Distortion

Continuous RMS Power (both channels driven)
32 + 32W (8Ω) at 1,000Hz
40 + 40W (4Ω) at 1,000Hz

Continuous RMS Power (each channel driven)
37/37W (8Ω) at 1,000Hz
50/50W (4Ω) at 1,000Hz
90W (8Ω)
120W (4Ω)

Dynamic Power (IHF)
120W (4Ω)

Total Harmonic Distortion
Overall (Aux to Speaker Output
20 to 20,000Hz)
less than 0.1% at rated power
less than 0.05% at 1 watt

Preamplifier Only (Phono to Rec. Out) less than 0.1% at rated power

Intermodulation Distortion (70Hz:7,000Hz = 4:1 SMPTE method)
Overall (Aux to Power Out)
less than 0.1% (8Ω) at rated power

Frequency Response (at 1 watt)
Overall (Aux, Tape PB to Power Out)
Deviation from RIAA (20 to 15,000Hz)
+0.5dB, -0.5dB

Damping Factor (8Ω)
better than 50 at 1,000Hz

Channel Separation (at rated power, 1,000Hz)
Overall from Aux, Tape PB
65dB

Hum and Noise (IHF, Closed Circuit A Network)
Overall from Phono
better than 75dB

Overall from Aux, Tape PB
better than 90dB

Residual Noise
less than 0.5mV

Input Sensitivity and Impedance (at rated power, 1,000Hz)
Phono
3mV (47KΩ)

Phono Max. Input Capability
150mV (THD 0.1%)

Aux, Tape PB
150mV (50KΩ)

Output Level and Impedance (at rated power, 1,000Hz)
Tape Rec Out
150mV (less than 500Ω)

DIN Tape Rec Out
30mV (less than 80KΩ)

Tone Controls
Bass
± 12dB at 50Hz
Treble
± 10dB at 10,000Hz

Filters
Low
-3dB at 50Hz (-6dB/oct.)
High
-3dB at 8,000Hz (-6dB/oct.)

Loudness Control (Continuous Loudness Volume at Minimum)
+ 10dB at 100Hz, +6dB at 10,000Hz

TUNER SECTION

FM:
Tuning Range
88-108MHz

Sensitivity (mono)
IHF
2.0μV
1.5μV

Sensitivity (stereo)
DIN (40KHz Dev.; S/N 26dB)
DIN (40KHz Dev.; S/N 46dB)

Image Frequency Rejection
45dB

IF Rejection
60dB

Spurious Response Rejection
45dB

AM Rejection
50dB

Capture Ratio
1.5dB

Selectivity
IHF
60dB
DIN (± 300KHz/40KHz Dev.)
60dB

Signal-to-Noise Ratio
Mono
68dB
DIN (75KHz Dev.)
62dB
DIN (40KHz Dev.)

Stereo
66dB
DIN (75KHz Dev.)
60dB
DIN (40KHz Dev.)

Total Harmonic Distortion (Antenna Level: 1mV)
Mono
less than 0.3%
DIN (400Hz; 75KHz Dev.)
less than 0.3%
DIN (1KHz; 40KHz Dev.)

Stereo
less than 0.5%
DIN (400Hz; 75KHz Dev.)
less than 0.5%
DIN (1KHz; 40KHz Dev.)

Stereo Separation
IHF (400Hz; 75KHz Dev.)
40dB
DIN (1KHz; 40KHz Dev.)
40dB
50-10,000Hz

Frequency Response
IHF (75KHz Dev.)
28dB
DIN (40KHz Dev.)
28dB

Sub-Carrier Suppression
± 1.0dB
40dB
300Ω balanced
75Ω unbalanced

Antenna Impedance

AM:
Tuning Range
525 to 1,605KHz

Useful Sensitivity (IHF)
50dB/m

Signal-to-Noise Ratio
43dB at 80dB/m

Image Frequency Rejection
40dB at 1,000Hz
25dB at 1,000Hz

Selectivity
40dB at 1,000Hz

IF Rejection

GENERAL

Power Source
USA & Canada
Other Areas

AC 117V, 60Hz
AC 110/130/220/240V
50/60Hz
190W

Power Consumption
AC Outlets (max. total 200 watts)

Switched
Unswitched

1
1

Dimensions

465 x 157 x 335mm
18 1/2" x 6 1/4" x 13 1/4"

Weight

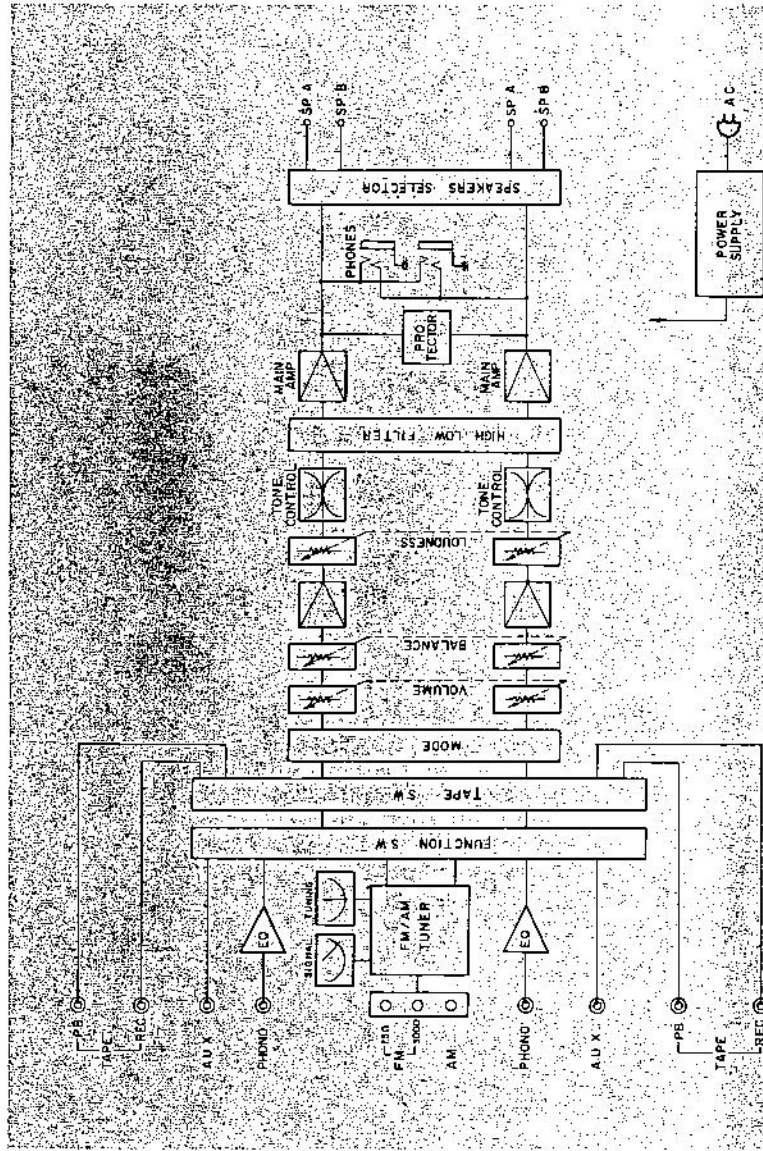
9.3Kg (20.6 lbs.)

Finish

Wood cabinet, American
walnut grain

Specifications subject to change without notice.

BLOCK DIAGRAM





SINCE 1887

YAMAHA
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