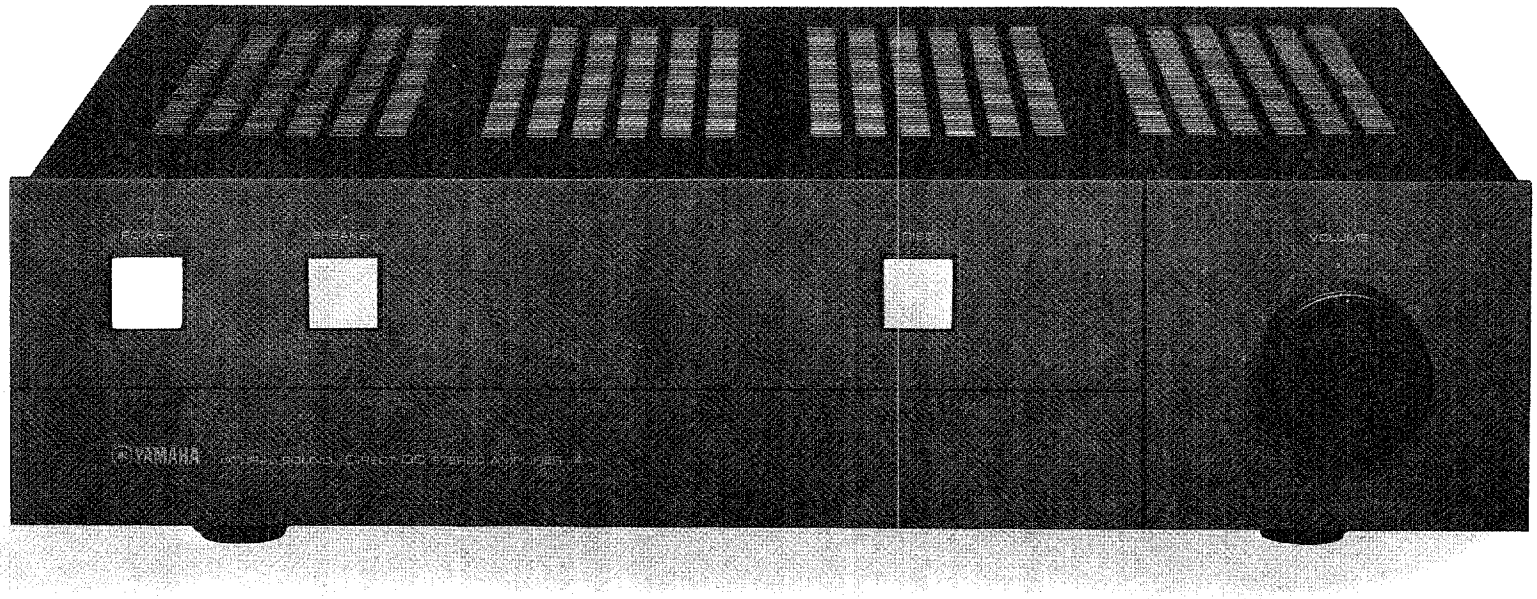
YAMAHA

INTEGRATED STEREO AMPLIFIER A-1

OWNER'S MANUAL



U/C

YAMAHA thanks and congratulates you on your selection of the A-1 stereo amplifier. This exciting amplifier is a great tribute to the audience by the YAMAHA engineers who are unique in that they combine the most modern electronics sound reproduction knowhow with the wisdom aquired over many years' experience in the musical instrument manufacture. The A-1 embodies versatile functions, a sophisticated circuit configuration and carefully selected parts.
The disc switch arrangement, particularly, allows disc signals from the equalizer amplifier to reach the power amplifier in a direct manner, to achieve a new high quality in fine and delicate musical signals from disc grooves. Here, the A-1 justifiably claims to be a TRUE DC amplifier.
In order to obtain from your A-1 the long life of service it is capable of, please carefully read this instruction manual.

Features

- The DISC switch on the front panel allows direct transmission of all the musical signals from a disc to the speaker system. When the DISC switch is on, the equalizer and power amplifier are connected with the Yamaha's original film, capacitor, which is the only one in the signal path.
- When the DISC switch is off, it functions as a high quality stereo amplifier with the talented controls stored behind the sealing panel.
- Careful selection of circuit elements and sophisticated layouts contribute to the high sound quality reproduction.
- The built-in high performance MC amplifier consisting of Yamaha's original super low noise elements.
- High operating characteristics backed by the design considerations which attach importance to N.D.C.R. characteristics under practical operating conditions.
- Adoption of two massive power transformers so arranged as to cancels each other's leakage flux and of an also large capacity, 18,000μF, electrolytic capacitor. The stable power supply section assures high sound quality due to careful design considerations.
- The slim and elegant appearance combined with high operationability.

Contents

IMPORTANT!

Please record the serial number of your unit in the space below

Model Name A-1
Serial No. _____

The serial number is located on the rear of the chassis.

Retain this Owner's Manual in a safe place for future reference.

A-1

CAUTION; READ THIS BEFORE OPERATING YOUR A-1

1

The A-1 is a high performance integrated amplifier with low distortion and high output power. This manual is required reading if you are to get the best from its special features and controls.

2

Do not drop or otherwise jar the A-1, which is a precision electronic instrument.

3

Do not place the A-1 where it will be exposed to direct sunlight, excessive heat (for instance over a radiator), cold, moisture, or dust.

4

Do not use chemical solvents (such as benzene or alcohol) to remove traces of dirt. Wipe only with a soft, slightly damp cloth.

5

Do not attempt to carry out internal adjustments or repairs. Leave these to your local service representative.

6

Do not assume your A-1 is faulty before checking the Trouble Shooting list on page 19 for common operating errors.

7

Operate all switches and knobs in accordance with the instructions. Avoid applying undue force, which should never be necessary, and do not attempt to use intermediate settings.

8

Note that the muting circuit keeps the A-1 silent for several seconds after switching ON, to prevent the pops and clicks that can occur.

9

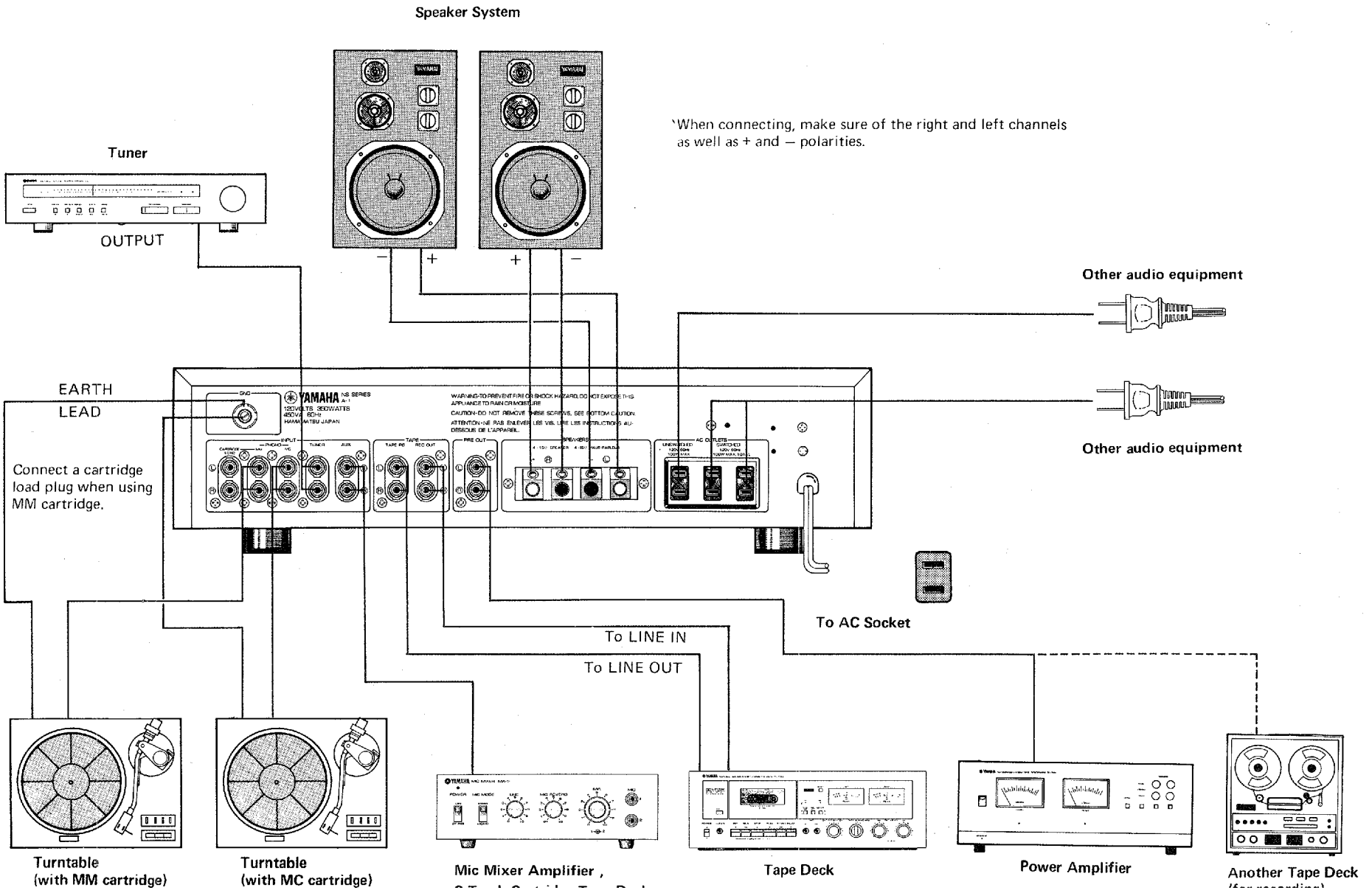
Do not connect other audio equipment to the spare AC outlet sockets on the rear panel if they will require more power than the outlets are rated to provide.

10

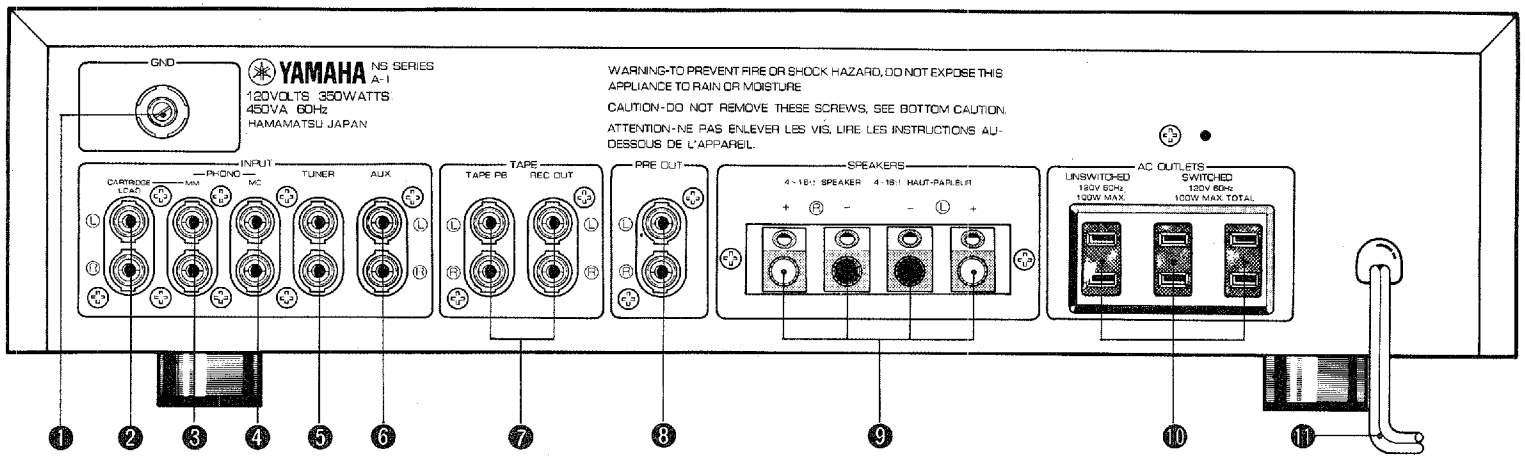
Keep this manual in a safe place for future reference, and refer to it frequently until you are perfectly familiar with all A-1 controls and functions.

Warning — to prevent fire or shock hazard, do not expose this appliance to rain or moisture.

A-1 CONNECTION DIAGRAM



A-1 THE NAMES AND FUNCTIONS OF THE PARTS



❶ Ground (GND) Terminals

This GND terminal is provided for grounding turntable units, etc. Please make sure that all such units are firmly grounded: failure to connect the ground leads can result in unpleasant hum.

* Refer to page 8 for connection.

❷ PHONO-CARTRIDGE LOAD Terminals

These terminals are provided for connecting an accessory cartridge load plug which is matched with the impedance of your MM cartridge.

* Refer to page 8 for connection.

❸ PHONO-MM Terminals

These terminals are for connecting turntables using MM (moving magnet) cartridges.

❹ PHONO-MC Terminals

These terminals are for connecting a turntable using an MC (moving coil) cartridge.

The upper terminal is for the left channel, the lower for the right. The same is true for all the other pairs of terminals.

* Refer to page 8 for connection.

❺ TUNER Terminals

These terminals are for connecting AM/FM tuner.

* Refer to page 10 for connection.

❻ AUX Terminals

Use these terminals for connecting an 8-track tape player, mic mixer amplifier, or other item of audio equipment, etc.

❼ TAPE PB & REC OUT Terminals

Connect the TAPE PB terminals to the tape deck LINE OUT terminals, and connect the REC OUT terminals to the tape deck LINE IN terminals.

* Refer to page 11 for connection.

❽ PRE OUT Terminals

These terminals are for connecting the signal output of A-1 to another power amplifier or tape deck.

❾ SPEAKERS Terminals

These terminals are for connecting one set of speaker system.

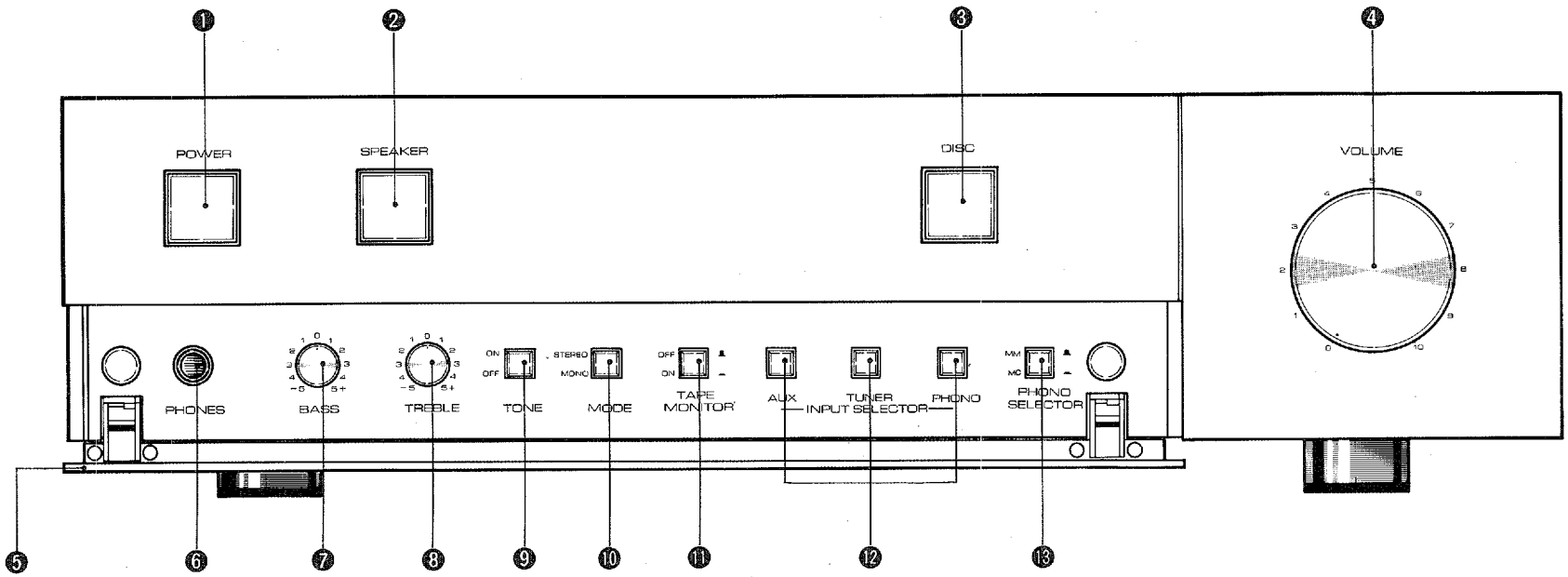
* Refer to page 8 for connection.

❿ AC OUTLETS

You can plug in other items of audio equipment. Two sockets are switched by the A-1 POWER switch. They are suitable for tuners and other low power units requiring up to 100 watts. The other one is unswitched, and can only deliver a total of 100 watts. *Do not exceed the maximum ratings.*

⓫ AC Power Cord

Plug the A-1 power cord into a mains power supply wall outlet socket.



❶ POWER Switch

Push this switch, and the A-1 will be supplied with main power and a lamp inside the switch will light. Push again to turn OFF power. The speaker does not sound for a few seconds after the switch is turned ON. This is because a speaker-protection circuit functions to eliminate poping noises which may be given when the switch is turned ON.

* Before pushing ON the POWER switch, always place the VOLUME knob in the minimum position (fully counterclockwise: 0) so as not to be gain an indiscreetly large sound.

❷ SPEAKER Switch

Push this switch, and a lamp inside the switch will light and connected speakers will operate. Push again to switch OFF the speakers.

❸ DISC Switch

This switch permits you to give a priority of disc play. Push the switch, and a lamp inside it will light and the A-1 will reproduce output signals of a connected record player prior to those of other program.

Push it again, and the A-1 will return to reproduce the program selected by the INPUT SELECTOR switch or TAPE MONITOR switch inside the sealing panel.

* Refer to page 8 for the connection and operation of record player.

❹ VOLUME Control

This knob permits you to control the overall sound volume. Turn it clockwise to increase the sound volume.

* When turning ON the POWER switch, always turn this switch fully counterclockwise (0) so as not to be given an indiscreetly large sound.

Arrangement of speaker system and furniture may affect the sound volumes of left and right speakers making them differ. In such a case, balance them by utilizing the front and inner parts of the knob which permit you to separately control the volumes of left and right channels, respectively.

❺ Sealing Panel

Switches and knobs which are not operated frequently once they are set are put together inside this sealing panel. It can be removed easily by a finger tip.

❻ PHONES Jack

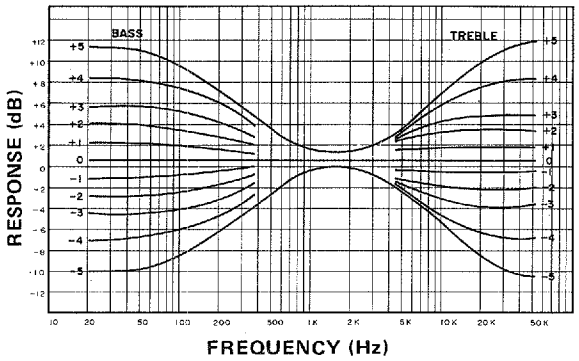
One headphone jack is provided. Plugging the headphone in does not mute the speakers, so push the SPEAKER switch.

❼ BASS-Tone Control

(The zero position in the center (0) is the flat condition point.)

This enables you to emphasize low frequency sounds (rhythm section, etc.) or to reduce them if your speakers sound 'boomy.' Turning to the right increases the bass response, and turning to the left reduces it.

* Refer to the Performance Graph below.



❽ TREBLE-Tone Control

(The zero position in the center (0) is the flat condition point.)

This works similarly for the high frequencies. Sometimes turning slightly to the left, to reduce high frequency response, can cut out unwanted 'hiss' noise or record scratch, although turning too far will give an unnatural or muffled sound. Turning to the right increases high frequency response to compensate for absorption by soft furnishings, curtains, etc.

* Refer to the Performance Graph below left.

❾ TONE Switch

This enables you to cancel the tone control circuit. With the switch pushed OFF (▬) the BASS and TREBLE knobs do not affect the tone control circuit. Place the switch in the ON (■) position to operate the tone control circuit.

❿ MODE Switch

This is a stereo/monaural changeover switch. The monaural mode is obtained in the MONO (▬) position, and the stereo mode in the STEREO (■) position.

* This MODE switch does not function when the DISC switch is ON.

⓫ TAPE MONITOR Switch

This permits you to monitor the playback signals of a connected tape deck. In the ON (▬) position the playback from a tape deck can be made. Place it in the OFF (■) position except when playing back.

* The tape playback can not be made when the DISC switch is depressed and the inside lamp lights.

⓬ INPUT SELECTOR Switch

This is a switch for selection of connected program sources.

Push a switch matched with a program source according to the table below.

INPUT SELECTOR SWITCH	PROGRAM SOURCE
PHONO	Record Audition
TUNER	Broadcasting Reception
AUX	Playback from an equipment connected to the AUX terminal

⓭ PHONO SELECTOR Switch

This permits you to match the A-1 with the cartridge of your record player. Place it in the MM (■) position in case of MM (moving magnet) cartridge, and in the MC (▬) position in case of MC (moving coil) cartridge.

A-1 CONNECTING AND OPERATING THE A-1 WITH OTHER COMPONENTS

CONNECTING A SPEAKER SYSTEM

(1) First fully slacken the A speaker terminal knobs by rotating fully to the left. Strip about one half-inch of insulation from the speaker leads and twist them together to eliminate stray ends (preferably soldering them together). Then insert into the hole, and screw the terminal knob tight.

(2) Make sure that you connect the + terminal on the A-1 to the + terminal on the speaker, and the – terminal on the A-1 to the – terminal on the speaker. A mistake here will result in poor bass response and ill-defined stereo image. Also make sure that you connect the left-hand speaker (viewed from the listening position) to the left-hand channel, and the right-hand speaker similarly to the right-hand channel.

(3) Speaker system operates by the SPEAKER switch on the front panel.

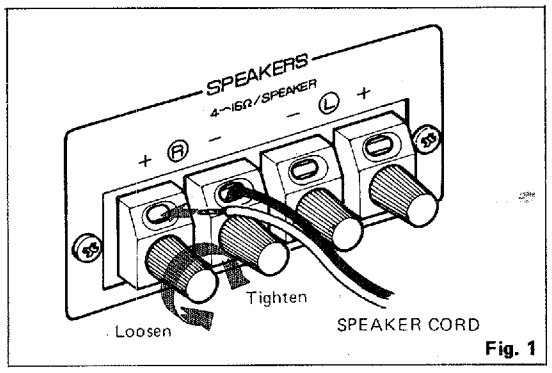


Fig. 1

CONNECTING A TURNTABLE UNIT

Two PHONO input terminals are provided for MM and MC cartridges.

Connect a record player with MM (moving magnet) cartridge to the PHONO-MM terminal.

If yours is a normal MM cartridge, connect a cartridge load plug with 47kΩ impedance to the PHONO-CARTRIDGE LOAD terminal.

In case of cartridges with other than 47kΩ impedance, connect a 68kΩ cartridge load plug or if the indicated load impedance is 100kΩ, do not connect any plug. (Fig. 2)

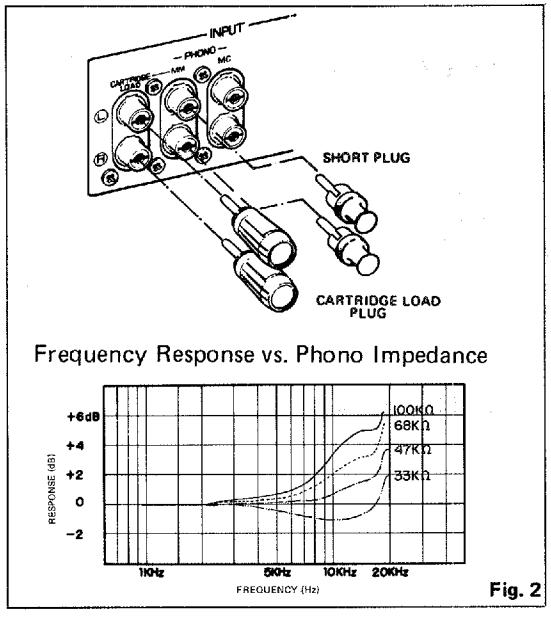


Fig. 2

* Refer to page 12 as to the cartridge load plugs.

In case of MC (moving coil) cartridge, connect the output cord directly to the PHONO-MC terminal.

When connecting, confirm L and R of the pin plug provided at the tip of shield wire from a player, and then connect a player with MM cartridge to the PHONO-MM terminal and a player with MC cartridge to the PHONO-MC input terminal. (Fig. 3)

If a grounding wire is provided together with the pin plug, connect it to the GND terminal on the rear panel.

* When the PHONO-MM input terminal is not used, never fail to use an accessory short plug so as to prevent a click noise at PHONO SELECTOR switching.

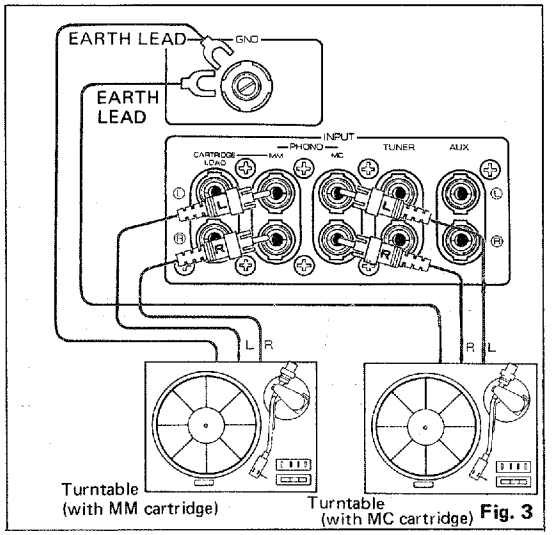


Fig. 3

- **PLAYING RECORDS STRAIGHT WITH DISC SWITCH PUSHED ON (THE LAMP INSIDE THE SWITCH LIGHTS.)**

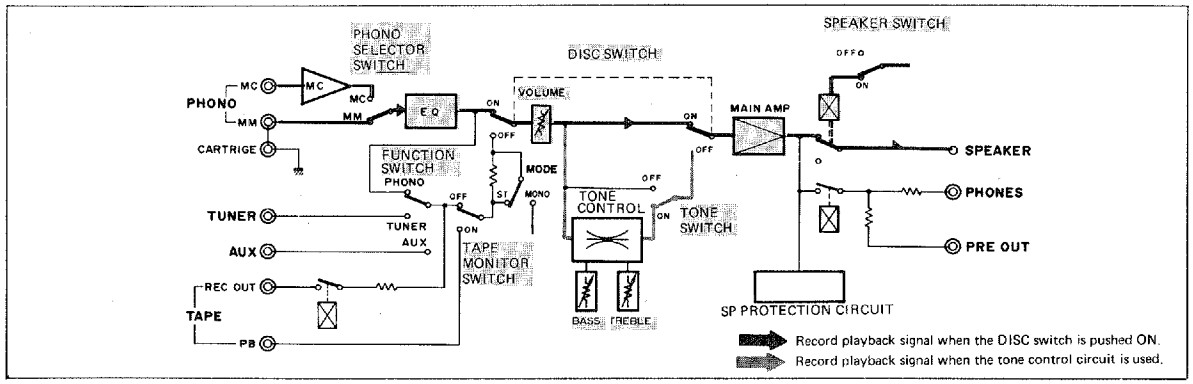
* You can enjoy high-fidelity reproduction of records.

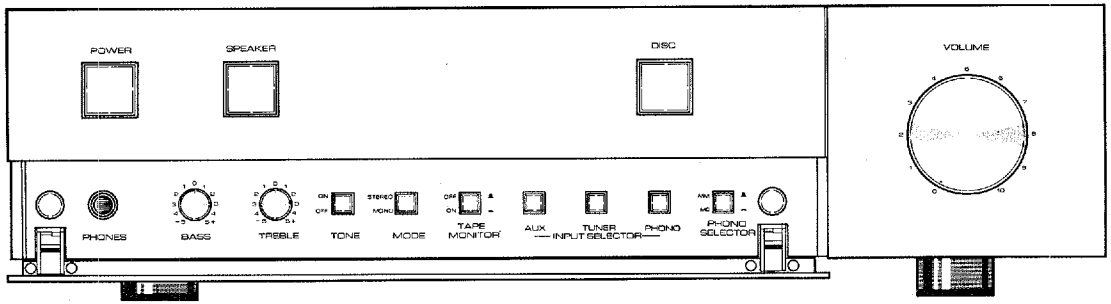
1. Check the connecting cord.
2. Place the PHONO SELECTOR switch in the MM or MC position according to your cartridge.
   * If yours is MM cartridge, insert a cartridge load plug into the CARTRIDGE LOAD terminal on the rear panel considering the most suitable load impedance of your cartridge or according to your taste.
3. Push the POWER switch to supply power for the amplifier.
   * Before turning ON the power switch, turn the VOLUME control knob fully counterclockwise to the "O" position.
4. Push the DISC and SPEAKER switches, and the lamps inside the switches will light.
5. Start record play.
6. Gradually turn the VOLUME control knob clockwise to obtain an appropriate sound volume.
7. When you wish to stop the record play, turn the VOLUME control knob fully counterclockwise to the "O" position, and stop the record player before pushing the POWER switch to turn OFF power.

- **PLAYING RECORDS UTILIZING TONE CONTROL CIRCUIT (BY TURNING OFF DISC SWITCH)**

* You can obtain your desired tone matched with your room.

1. Check the connecting cord.
2. Place the PHONO SELECTOR switch in the MM or MC position according to your cartridge.
   * If yours is MM cartridge, insert a cartridge load plug into the CARTRIDGE LOAD terminal on the rear panel considering the most suitable load impedance of your cartridge or according to your taste.
3. Push the POWER switch to supply power for the amplifier.
   * Before pushing ON the POWER switch, turn the VOLUME control knob fully counterclockwise to the "O" position.
4. Push the PHONO button of the INPUT SELECTOR switch.
5. Make sure the TAPE MONITOR switch is placed in the OFF (■) position.
6. Push the SPEAKER switch, and the lamp inside the switch will light.
7. Place the MODE switch in the STEREO (■) position when playing a stereo record, and in the MONO (▬) position when playing a monaural record.
8. Start record play.
9. Gradually turn the VOLUME control knob clockwise to obtain an appropriate sound volume.
10. Make sure the TONE switch is placed in the ON (■) position.
    * With the TONE switch placed in the OFF (▬) position, the BASS and TREBLE control knobs do not function.
11. Turn the BASS and TREBLE control knobs to obtain your desired tone.
    * The characteristic is flat in the "O" position.
12. When you stop the record play, turn the VOLUME control knob fully counterclockwise to the "O" position and stop the record player before pushing the POWER switch to turn OFF power.





TUNER CONNECTION

Connect the tuner output terminals to the A-1 TUNER input jacks on the rear panel, using the pin-plug cable provided. Make sure to confirm that the left-hand and the right-hand outputs are connected to the proper input terminals.
Next, set the DISC switch to OFF and the TAPE MONITOR switch to OFF (■) position.
To enjoy your tuner, push the TUNER push-button of the INPUT SELECTOR, and operate the tuner to receive the desired AM or FM signal.

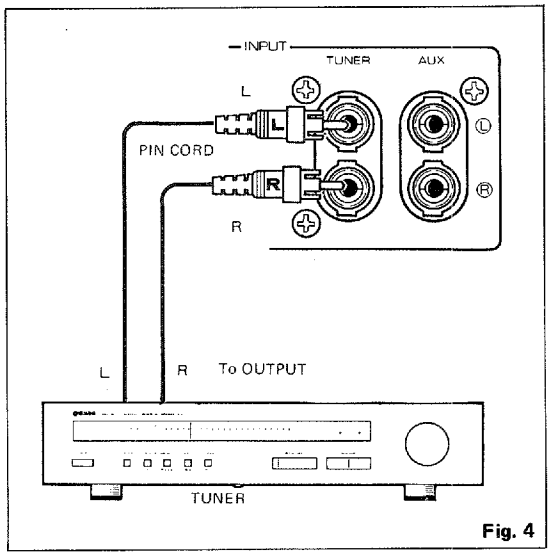
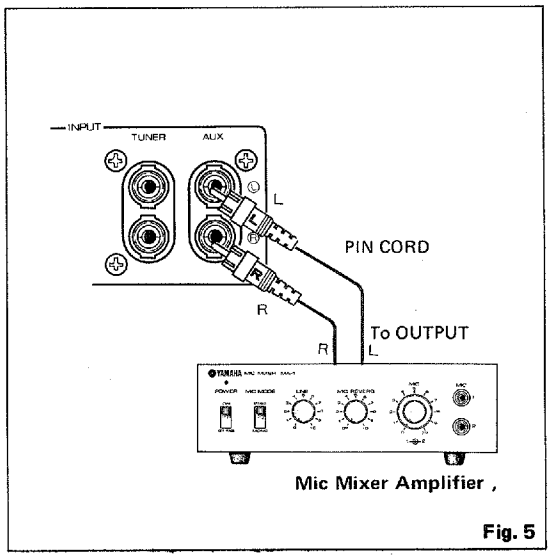


Fig. 4

AUXILIARY INPUT CONNECTION

This is a spare input for any sound source you wish to connect to the A-1. When connecting a stereo source to these terminals, insure the left-hand and the right-hand plugs are inserted in the proper terminals.
This input has a sensitivity of 200mV, and can be used for such inputs as mic mixer amplifier, 8-track tape player.
To listen these auxiliary sound sources, *first,* set the DISC switch to OFF and the TAPE MONITOR switch to OFF (■) position. Next, push the AUX push-button of the INPUT SELECTOR, and operate the connected audio equipment.



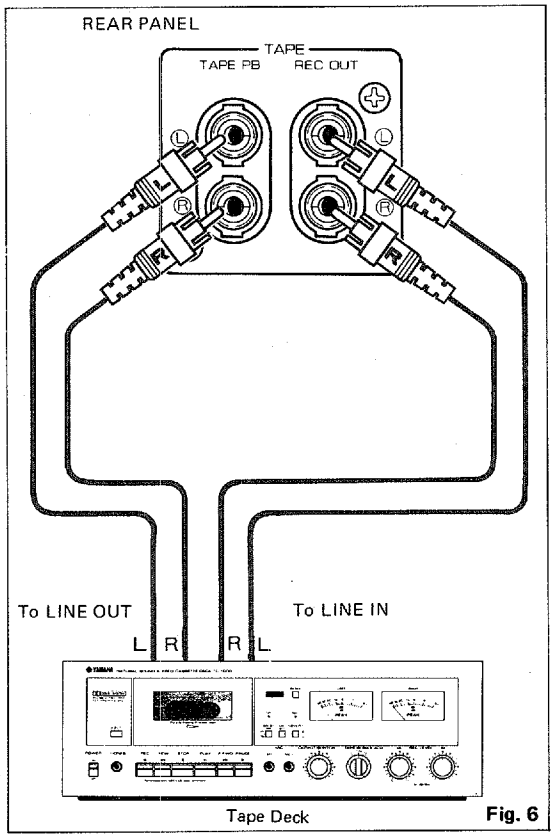
Mic Mixer Amplifier ,

Fig. 5

TAPE DECK CONNECTION

Connect a tape recorder to the A-1 as follows:

A-1 Rear Panel		Tape Deck Terminals
TAPE PB	⟷	LINE OUT
REC OUT	⟷	LINE IN



Tape Deck **Fig. 6**

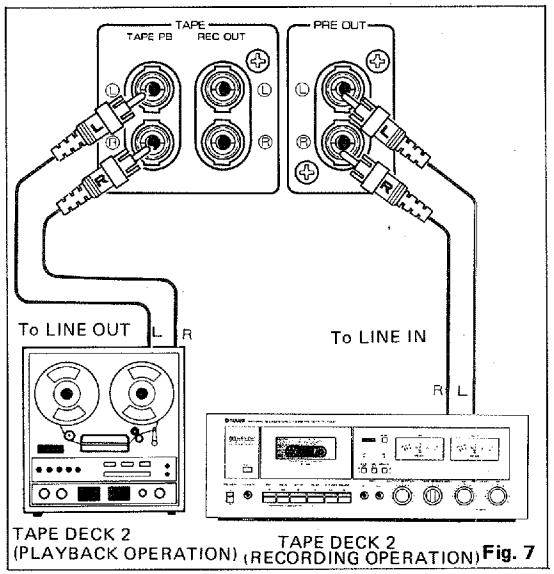
TAPE DECK PLAYBACK

Push the TAPE MONITOR switch on the front panel to ON, and the DISC switch to OFF (switch lamp goes out).

To listen tape sound, use the tape deck playback operation.

TAPE DECK RECORDING

When you wish to make a recording, push the INPUT SELECTOR push-button (AUX, TUNER or PHONO) of the desired program source, and use the tape deck recording operation.



TAPE DECK 2 (PLAYBACK OPERATION) TAPE DECK 2 (RECORDING OPERATION) **Fig. 7**

TAPE TO TAPE DUBBING

For tape-to-tape dubbing, you will need two decks. Connect recording tape deck LINE IN to the PRE OUT terminals of the A-1 rear panel, and set the TAPE MONITOR switch to ON (▬), the DISC switch to OFF.

Note: You can not copy to tape deck 1 from tape deck 2.

Note: The signals from the PRE OUT terminals which are recorded by your tape deck are influenced at VOLUME control of the A-1.

HEADPHONE

Plug the headphone into the headphone (PHONES) terminal in the sealing panel. Please notice that the headphone's left and right are rightly on your ears when using it. (Fig. 8)

If you wish to cut out the speaker sound, simply press the SPEAKER switch.

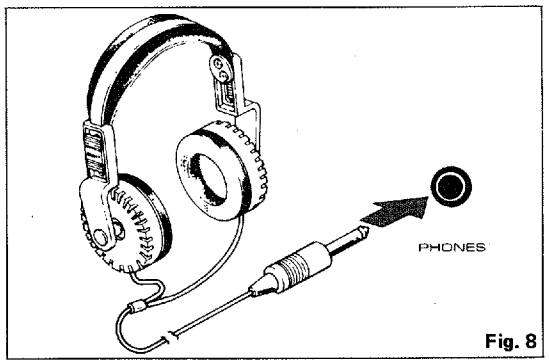


Fig. 8

A-1 DISC SWITCH AND CARTRIDGE LOAD

DISC SWITCH

This is a unique switch to permit you to directly couple the superior DC equalizer and DC main amplifier of A-1 by a single switch operation.
As shown in the block diagram (Fig. 9), when the DISC switch is ON (when the lamp inside the switch lights), the output signal of the equalizer has priority to other input signal (TAPE PB, TUNER, AUX), and is transmitted directly to the main amplifier over the tone control section. Thanks to this, the circuit is simplified enabling transmission of true signal to the speaker and at the same time ensuring simplified operation for record playing.

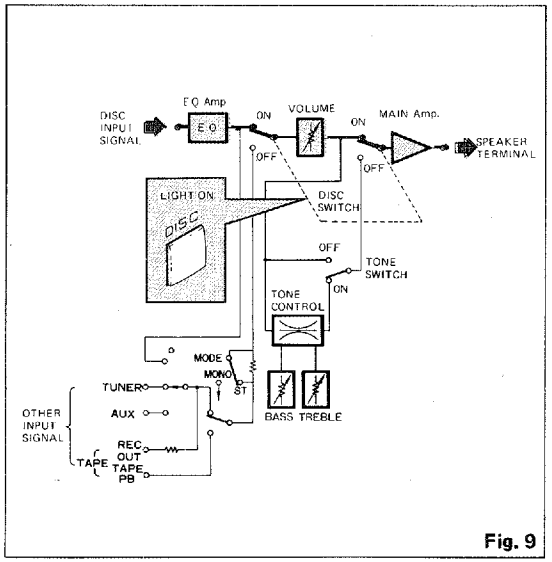


Fig. 9

CARTRIDGE LOAD

The input impedance of amplifier affects the frequency response of MM cartridge while the most suitable load impedance of amplifier depends on the cartridge. That is, the frequency response changes considerably depending on the PHONO input impedance (Refer to page 8.).
When inserting a cartridge load plug with the most suitable impedance for the cartridge into the CARTRIDGE LOAD terminal of A-1, the most suitable response for the A-1 is obtained. Also, by changing a cartridge load plug according to your taste, you can change the high-frequency zone characteristic.

Cartridge load plug:

- Normally, insert 47kΩ plug. In this case the input impedance of amplifier becomes 47kΩ.
- When 68kΩ plug is inserted the input impedance of amplifier becomes 68kΩ.
- When no plug is connected to the CARTRIDGE LOAD terminal the input impedance of amplifier becomes 100kΩ.

* If you want to set an input impedance other than 47kΩ, 68kΩ and 100kΩ, you can calculate the impedance of cartridge load plug from the following formula and the graph shown in Fig. 10.

Impedance to be applied =

$$\frac{100 \times (\text{desired input impedance})}{100 - (\text{desired input impedance})}$$ Unit: kΩ

Example: If 33kΩ input impedance is desired,

$$\frac{100 \times 33}{100 - 33} = 49.3\text{k}\Omega$$

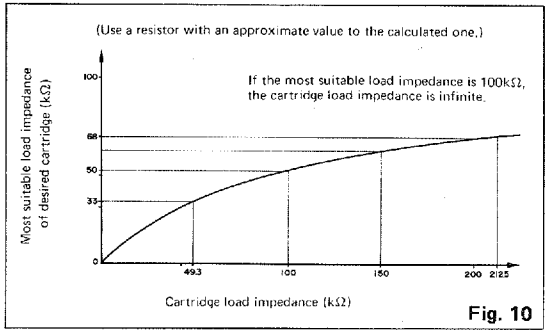


Fig. 10

TONE SWITCH

The TONE switch inside the sealing panel functions similarly to the DISC switch. But, while the DISC switch effects a priority of record play to other program, the TONE switch cuts off the tone control section making the circuit simplified when the DISC switch is OFF (Fig. 11).
When tone control is required, place this switch in the ON (■) position and control the tones of low and high sound zones by turning the BASS and TREBLE knobs. Also, the tone control section has a built-in subsonic filter. If a warped disc or other causes an unsteadiness of a cone paper of spaker in the ultra-low frequency, place this switch in the ON (■) position and the BASS knob in the 0 position, and the tone control section will operate as a subsonic filter.

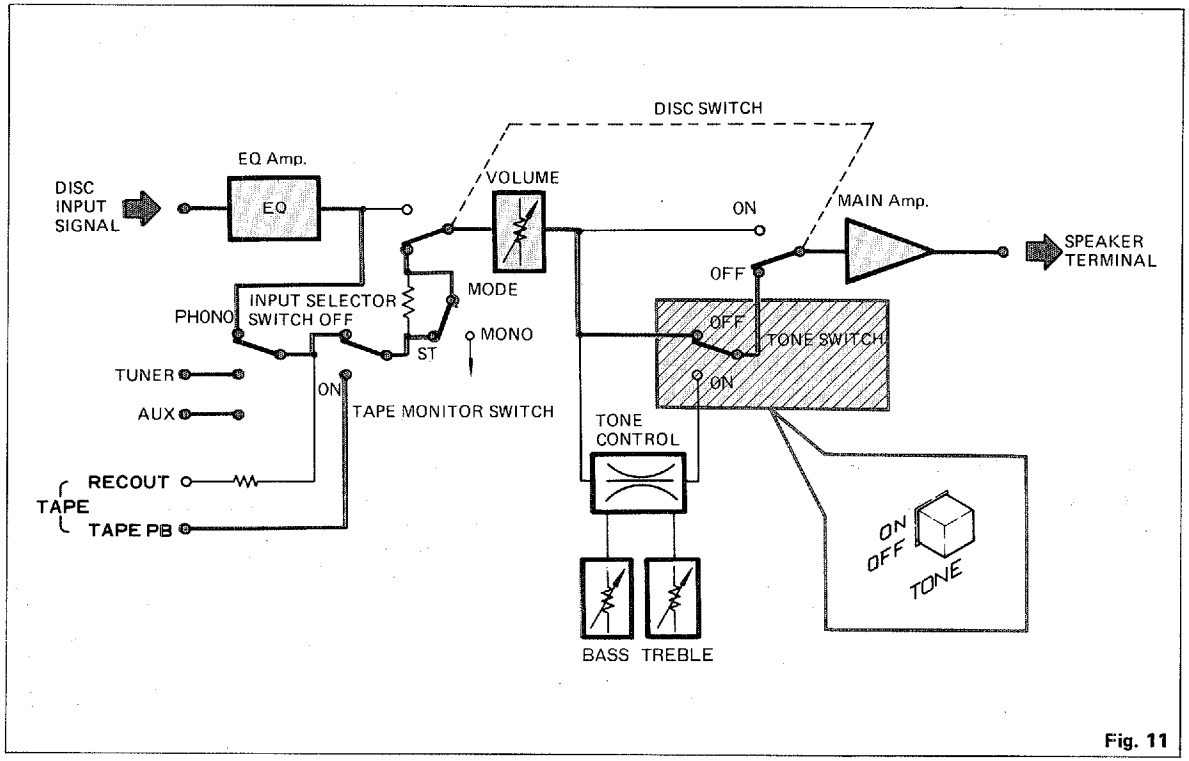


Fig. 11

1. CIRCUIT CONFIGURATION

The DISC ON circuit configuration is such that the equalizer amplifier directly connects with the main amplifier, i.e.: Low noise MC head amplifier → DC equalizer amplifier → DC high gain main amplifier. And when DISC switch is OFF: Low noise MC head amplifier → DC equalizer amplifier → Tone control amplifier → DC high gain main amplifier. Not only each amplifier unit is bestowed with improved characteristics in all distortion ratio, crosstalk, SN ratio, and transient characteristics but also the overall characteristics of the whole amplifier is upgraded to a large extent as is obvious in its RIAA deviation characteristics, and N.D.C.R characteristics.

2. EQUALIZER AMPLIFIER

The equalizer amplifier adopts Yamaha's original super low noise dual FETs in current mirror differential amplification, and its output stage uses a transistorized A-B Class SEPP in a DC amplifier, where no capacitor is used in the input circuit nor electrolytic capacitor in the NF circuit. This equalizer exhibits low noise ability of 85dB SN ratio (2.5mV) and low distortion factor of 0.005% or less (REC OUT) at 20Hz to 20kHz. What's more, its distortion factor remains superior against impedance increase in the high frequency range of a cartridge connected to Input. The CARTRIDGE LOAD plug further permits to set the optimum impedance for each cartridge to use (Refer to P.8).

3. MAIN AMPLIFIER

The A-1's main amplifier is designed for input sensitivity of 200mV, higher in gain than ordinary amplifiers. It's circuit configuration consists of: Yamaha's original low noise dual FET differential amplifier circuit in the first stage → Pre-drive stage of current mirror load differential amplifier circuit → Emitter follower buffer amplifier → Darlington connection SEPP OCL DC amplifier. The combination of carefully selected dual FETs with the sophisticated circuit configuration, parts and parts arrangement has reduced thermal and time drift to a possibly minimum at medium voltage, which is an important problem a DC amplifier has to cope with. Its characteristics are so excellent as: residual noise, 50μV or less (DISC ON); distortion factor, 0.01% or less (20Hz to 20kHz, 35W output — refer to Frequency vs. Total Harmonic Distortion); and damping factor, over 100 (1kHz, 8Ω).

4. MC HEAD AMPLIFIER

The A-1 has a built-in MC amplifier which makes possible direct MC cartridge sound reproduction. It presents as high low-noise characteristics as 70dB or more at 60μV and a superior distortion factor of 0.01%/2V or less at 20Hz to 20kHz.

5. TONE CONTROL CIRCUIT

The tone control circuit comprises two stages, the first of which is a FET differential amplifier, i.e. the NF-CR type amplifier featuring flat control characteristics. The tone amplifier also acts as a 10Hz, 12dB/oct subsonic filter. This means that the TONE switch in OFF position permits by-passing the control circuit, and that even when the switch is in ON position flat characteristics are available with the BASS and TREBLE controls in their center position. The TONE switch accordingly allows subsonic filter's ON/OFF.

6. POWER CIRCUIT

Two large capacity transformers are so arranged as to cancel each other's leakage flux, in parallel connection. Two units of large capacity electrolytic capacitors, 18,000μF, carefully selected from a standpoint of sound quality, are used for the power section. Metalized Mylar capacitors, 2.2μF, in parallel connection, efficiently check impedance increase in the high frequency range. The printed circuit board subject to a high current adopts 70 microns copper foil two times thicker than the ordinary boards, greatly contributing to sound quality improvement.

7. IMPROVED ACTUAL USE CHARACTERISTICS

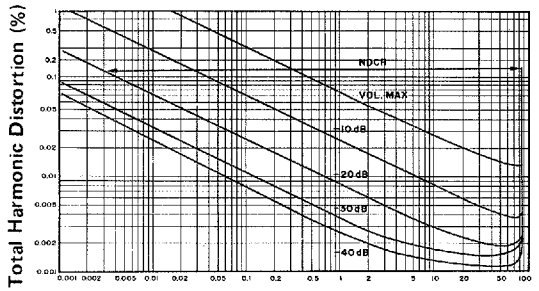
Improvements were achieved in overall characteristics in actual use (i.e. speaker reproduction of DISC, FM, and TAPE). Noise-distortion Clearance Range (N.D.C.R.) is rated at 6mW to 70W (0.1% distortion, VoL-20dB 1HF — A Net Work), from PHONO to SPEAKER OUT. (Refer to N.D.C.R. characteristics.) Rejection ratio of external noise is also superior. PRE OUT and REC OUT terminals are designed for low impedance of 600Ω, which is advantageous when long shielded cables are used. Elimination of a balance volume has contributed to decreased volume impedance and resultantly improved noise and distortion characteristics in actual use.

N.D.C.R. is an abbreviation of Noise-Distortion Clearance Range.

NDCR

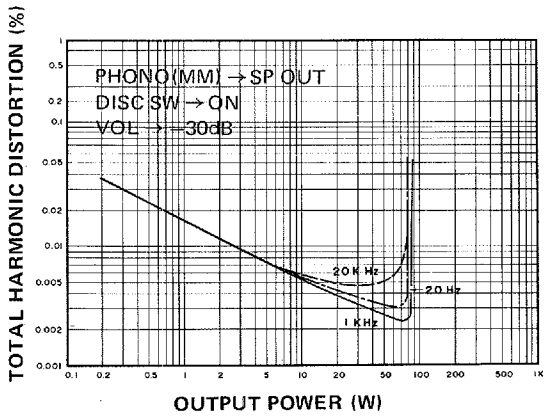
N.D.C.R. presents overall characteristics covering from PHONO inputs to SP OUT terminals at maximum volume through —40dB, with 1kHz signals. The measured values reveal that distortion and noise components have been eliminated in actual use, for example, reproduction at VOL → —30dB and at 5 ~ 70W output, such components are rated at merely less than 0.002%.

PHONO(MM) → SP OUT
DISC → ON
1kHz A network

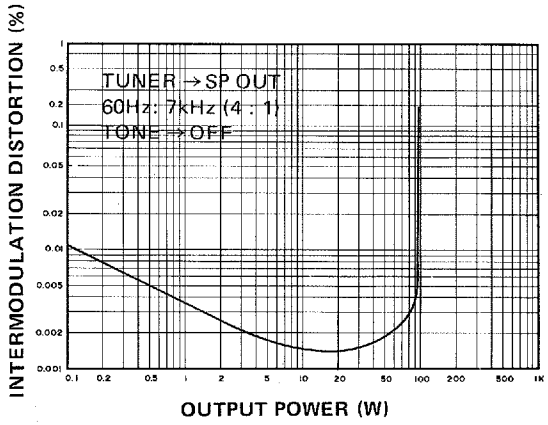


A-1 PERFORMANCE GRAPHS

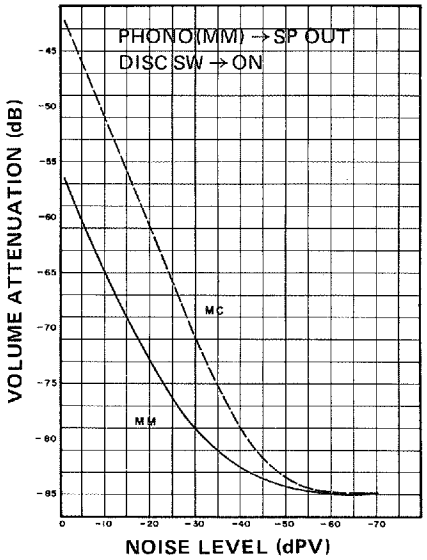
Output Power vs. Total Harmonic Distortion



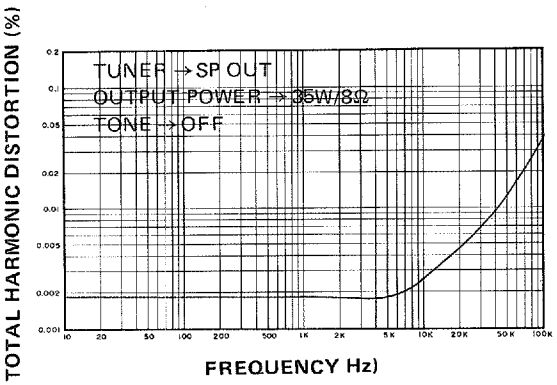
IM Distortion vs. Output Power Characteristics



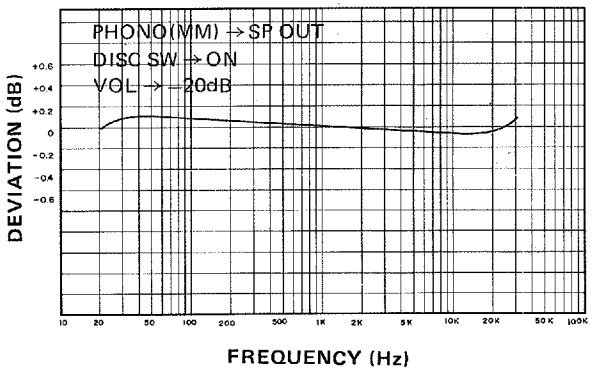
Noise Level and Volume Attenuation from PHONO to SP OUT (1kHz, IHF-A Network)



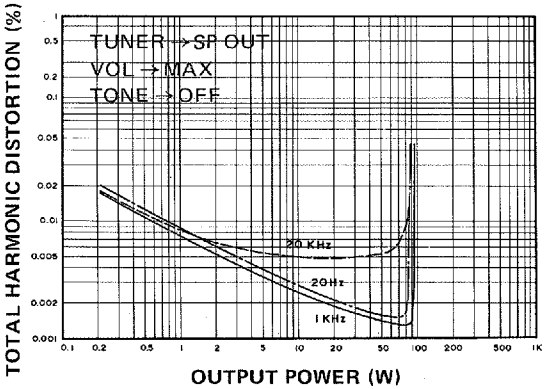
Frequency vs. Total Harmonic Distortion for TUNER to SP OUT



RIAA Deviation



Total Harmonic Distortion for Output Power for TUNER to SP OUT



A-1 SPECIFICATIONS

Output Power	
Continuous rms power	
20 to 20,000Hz 8Ω	70 + 70 watts at 0.02% T·H·D
4Ω	80 + 80 watts at 0.05% T·H·D
Total Harmonic Distortion Ratio	
PHONO MM to REC OUT (20Hz~20kHz 8V output)	
	0.005%
PHONO MC to REC OUT (20Hz~20kHz 2V output)	
	0.01%
TUNER to Sp Out (20Hz~20kHz 35 watts)	
	0.01%
IM Distortion Ratio (60Hz : 7kHz = 4 : 1)	
TUNER to Sp Out (8Ω, 35 watts)	
	0.003%
Power Bandwidth (8Ω, 35 watts, 0.03% T·H·D)	
	10 to 50,000Hz
Damping Factor (8Ω, 1kHz)	
	Better than 100
Frequency Response	
TUNER, AUX, TAPE to Sp Out (8Ω)	
	20 to 20,000Hz +0dB, −0.2dB
TONE OFF	10Hz: 0±0dB, 100kHz: $0\pm^{0}_{2}$dB
TONE ON	10Hz: −4±0.5dB, 100kHz: $0\pm^{0}_{2}$dB

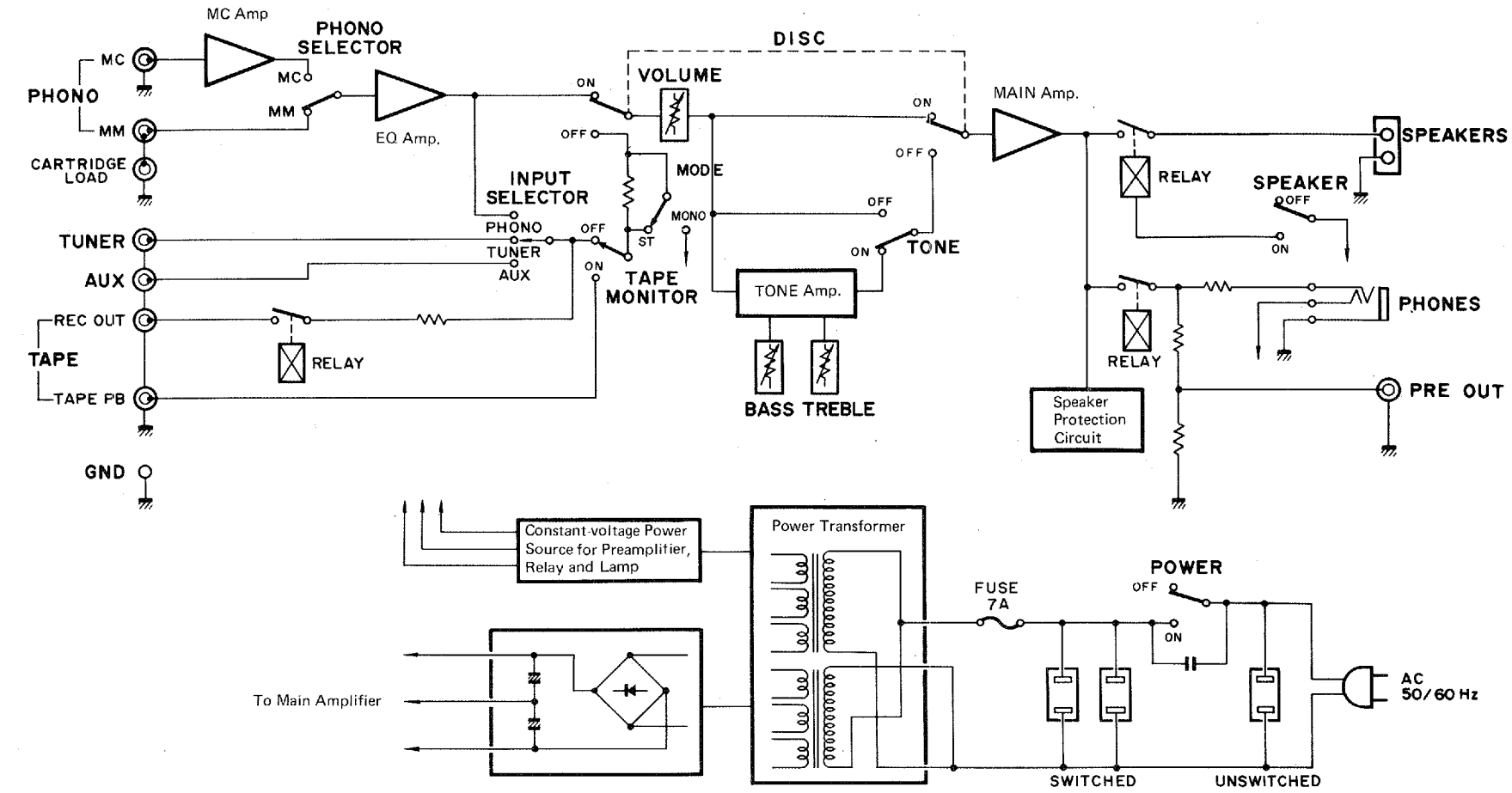
RIAA Deviation	
20 to 20,000Hz	0±0.2dB
Input Sensitivity/Impedance	
PHONO MM	2.5mV/47kΩ
PHONO MC	60μV/10Ω
TUNER, AUX, TAPE	200mV/47kΩ
Maximum Input Levels (at 1kHz)	
PHONO MM (0.01% T·H·D)	
	230mV r.m.s.
PHONO MC (0.01% T·H·D)	
	6mV r.m.s.
Tone Control Characteristics	
BASS	350Hz±10dB at 20Hz
TREBLE	3.5kHz±10dB at 20kHz
Output Level/Impedance	
REC OUT	200mV/600Ω
PRE OUT	2V/600Ω
Signal to Noise Ratio	
PHONO MM	85dB (IHA A Network)
PHONO MC	70dB (IHA A Network)
TUNER, AUX, TAPE	112dB (TONE: OFF)
	105dB (TONE: ON)
Residual Noise (DISC: ON, TONE: OFF)	
	50μV

Channel Separation (at 1kHz)	
TUNER to Sp Out	70dB (5.1kΩ Input)
PHONO MM to Sp Out	75dB (5.1kΩ Input, Vol −30dB)
PHONO MC to Sp Out	75dB (shorted, Vol −30dB)
N·D·C·R (PHONO MM to Sp Out, 0.1% T·H·D, Vol −20dB IHF A Network)	
	6mW to 70W
Headphone Output	39mW (8Ω, rated power)
AC Outlets	
	SWITCHED 2 (100W Max Total)
	UNSWITCHED 1 (100W Max)
Power Supplies	120V AC, 60Hz
Dimensions (W x H x D)	
	435 x 117 x 381mm
	(17-1/8" x 4-1/2" x 15")
Weight	15.8kg (34 lb 13 oz)

Specifications subject to change without notice.

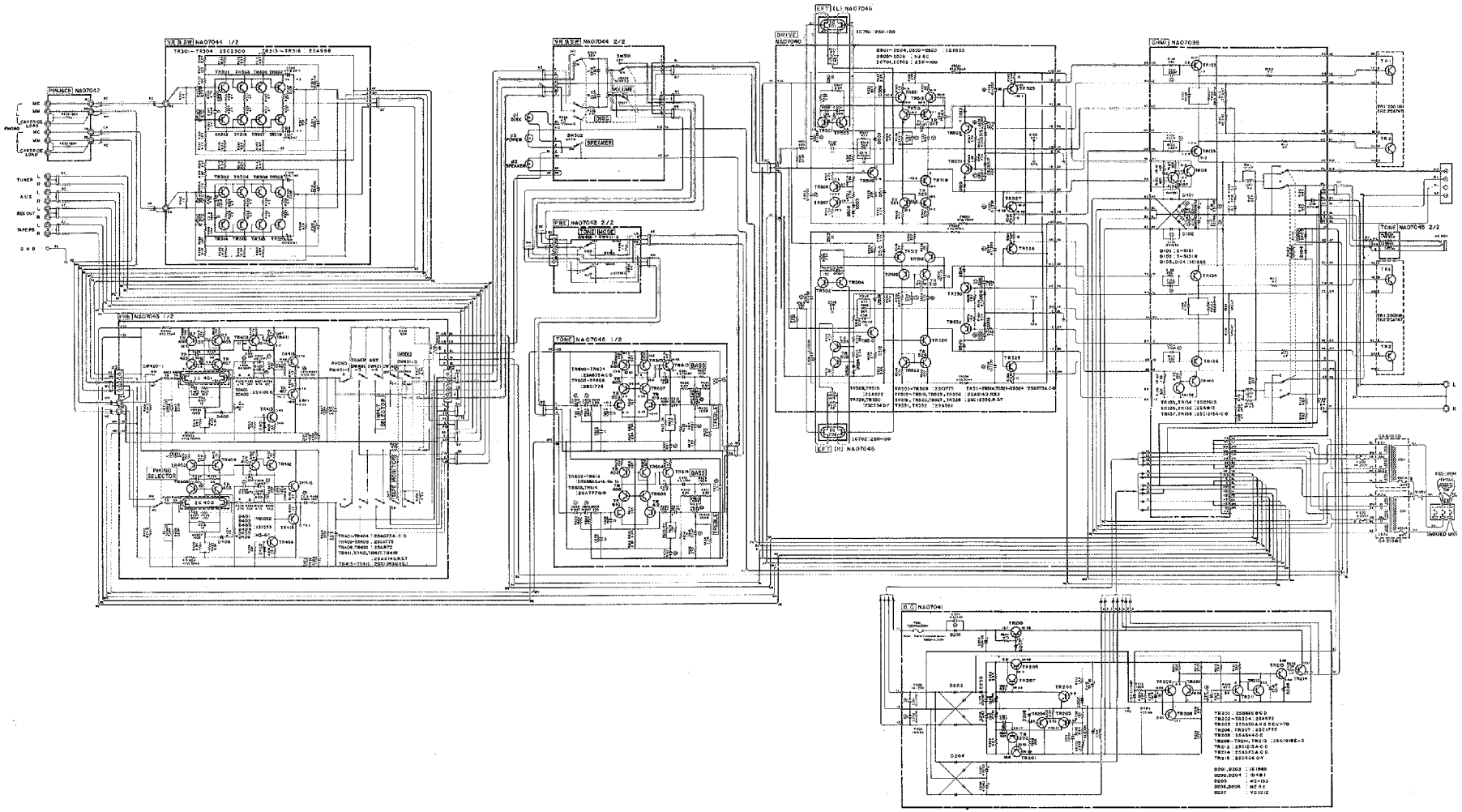
A-1 BLOCK DIAGRAM

(Shows only one channel.)



A-1

SCHEMATIC DIAGRAM



A-1 TROUBLE SHOOTING

Symptom	Cause	Remedy
Power is not supplied though the POWER switch is turned ON.	The power plug is not securely inserted into the mains receptacle.	Plug it securely.
	A fuse is gone.	Consult with an authorized Yamaha audio engineer.
No reproduced sound is given though the INPUT SELECTOR switch is operated.	The TAPE MONITOR switch is placed in the ON (▬) position.	In this case no program source other than tape playback is effected. Therefore, place the TAPE MONITOR switch in the OFF (■) position except for tape playback.
	The DISC switch lights. (ON condition)	In this case no program source other than disc play is effected. Therefore, push the DISC switch OFF except when playing a disc.
	The SPEAKER switch is not pushed ON.	Push the SPEAKER switch ON.
	The speaker system is not connected completely.	Connect the speaker system securely.
	The pin plug of input terminal is not inserted securely.	Plug it securely.
Sound through MC cartridge is low.	The output cord of MC cartridge is connected to MM terminal.	Connect it to MC terminal.
Turning the BASS or TREBLE knob does not effect tone control.	The DISC switch lights. (ON condition)	If the DISC switch lights, the tone control circuit does not function. Therefore, turn OFF the DISC switch.
	The TONE switch is placed in the OFF (▬) position.	Place the TONE switch in the ON (■) position.
No sound is given through both or either of left and right speakers.	Connection of speaker cord/s is imcomplete.	Make sure of the secure connection.
	The SPEAKER switch is not pushed ON.	Push the SPEAKER switch to light the lamp inside the switch.
	The L and R of VOLUME control knob is displaced.	Set the indexes of the front (for left speaker) and the inner (for right speaker) of the VOLUME control knob correctly.
Sound fails suddenly during reproduction.	An alternate current of over ±2V flows to the speaker output terminal, making the speaker protection circuit function.	Upon the voltage becoming 0V, a relay operates to connect the sound circuit.
		Turn OFF the POWER switch, and turn it ON again after a while.
	The power fuse is gone.	Consult with an authorized Yamaha audio engineer.
Reproduction lacks low sound and is unnatural while the sound image is unstable.	Phases (+ & −) of speaker are incorrect.	Re-connect matching the phases (+ & −) correctly.

SINCE 1887

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