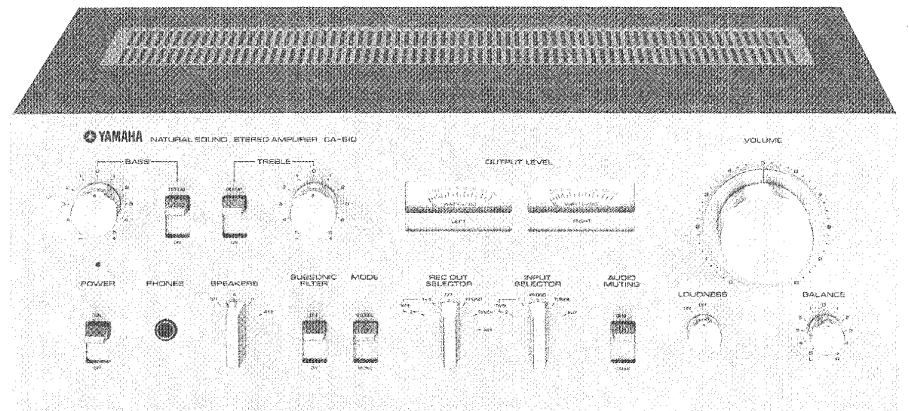


# YAMAHA

# CA-610

Stereo Pre-Main Amplifier

*Owner's Manual*



# CA-610

## CONTENTS

*YAMAHA offers you thanks and congratulations on your choice of the CA-610 pre-main amplifier. Product of research directed at making the best possible audio performance available to the widest range of enthusiasts, the CA-610 is currently setting new standards for its class.*

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### Special Features of Your CA-610 Intergrated Amplifier

#### 1. High Power and Low Distortion

With a generous minimum rms output power fo 40 Watts per channel, both channels driven, from 20Hz to 20kHz, into 8-ohm speakers, and no more than 0.05% distortion, CA-610 performance is exceptional. And the same low distortion is preserved right down to 250 mW, a tremendous power-distortion range. At 20 Watts distortion drops to 0.01% (and 0.005% at 1 kHz!).

#### 2. Full-Range Power Output Meters

The separate meters for L and R-hand channels cover the whole range from 0.01 Watt to 100 Watts in one unswitched range, a valuable feature that lets you know how much power your speakers are handling.

#### 3. Special Low Distortion NFB Tone Controls

Tone controls typically only contribute 0.008% to distortion from 20Hz to 20kHz, and there are separate defeat switches for bass and treble controls so that you can check the effect of tone-control settings.

#### 4. Comprehensive Operating Controls and Functions

With the CA-610 you can listen to any one source while recording any other, or while dubbing from one tape deck to another. Also you can isolate the CA-610 from the effects of tape-deck input impedance when recordings are not actually taking place by using the Rec Out Off position.

#### 5. Precise Continuous Volume Control Plus Muting

The muting switch offers instant reductions in listening volume of –20dB, and the volume control is an extremely precise, continuous type, in balance within  $\pm 1$ dB from 0 to –70dB.

#### 6. Many 'Extras' are Standard

The list of extra features includes comprehensive protective circuits, provision for two speaker systems, loudness switch for low level listening, subsonic (rumble) switch, and stereo/mono mode switch, etc.

# CA-610

## CAUTION - READ THIS BEFORE OPERATING YOUR CA-610

1

The CA-610 is a high performance pre-main amplifier, combining high output power with a full range of controls. This manual is required reading if you are to get the best from it.

2

Do not drop or otherwise jar the CA-610, which is a precision instrument.

3

Do not mount the CA-610 where it will be exposed to direct sunlight, excessive heat, 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 assume your CA-610 is faulty before checking the 'Trouble Shooting' list on page 11 for common operating errors.

6

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

7

Note that the muting circuit keeps the CA-610 silent for several seconds after switching ON, to prevent the pops and clicks that can sometimes occur.

8

If your CA-610 is provided with spare AC outlets on the rear panel, make sure that the units you connect do not require more power than the outlets are rated to provide.

9

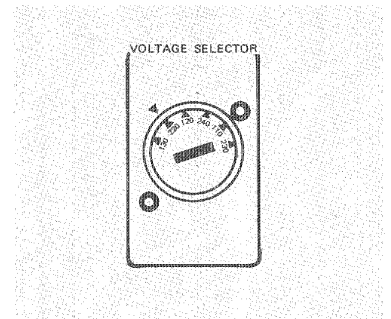
Always check the main VOLUME setting before returning the AUDIO MUTING switch to NORMAL. The sudden increase in level is enough to damage some speakers with the 40 watts rms per channel which the CA-610 provides if the level was too high to start with.

10

Keep this manual in a safe place for future reference, and refer to it frequently until you are perfectly familiar with all CA-610 controls and functions.

11

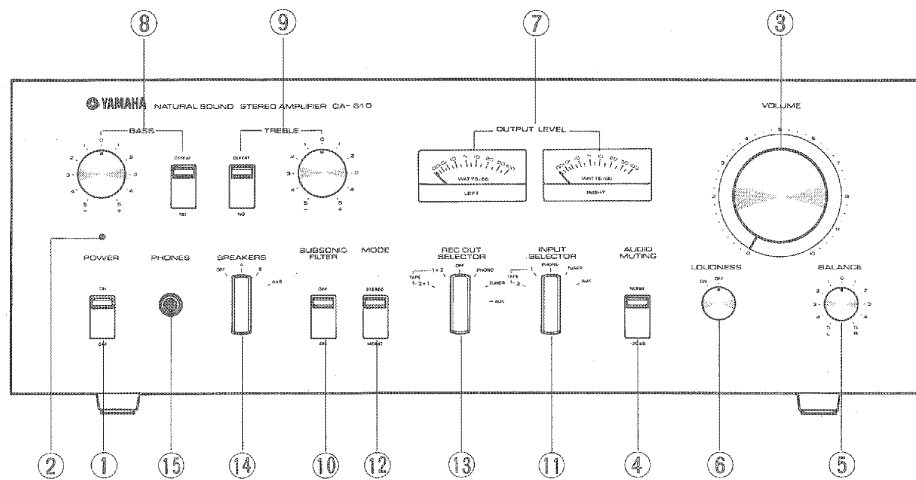
If your CA-610 has a voltage selector, before you plug in the AC supply, check that it is set to your local voltage. If not properly set, turn the knob to the correct position. Voltage settings: 110, 120, 130, 220, 230 and 240 V.



Canadian models are set for 117 V 60 Hz alone, and have no voltage selector.

# CA-610

## FRONT PANEL AND CONTROLS



### ① POWER ON/OFF Switch

Switch ON to connect the main electrical supply. The CA-610 will remain silent for a few seconds while the speakers are protected from the pops and clicks that can occur immediately after switching ON.

### ② POWER LED Indicator

With the POWER switch in the ON position, this light-emitting diode will illuminate, indicating that

the main electrical supply has been connected. If it goes out, with the POWER switch still ON, this can mean that the power fuse has blown.

### ③ VOLUME Control

Use this control to give the volume of sound that you require. Always start with the control turned fully to the left (counter-clockwise) at the '0' position, and then turn to the right (clockwise) to increase the volume to the level you require.

### ④ AUDIO MUTING NORM/-20 dB Switch

This offers a straight 20 dB reduction in signal level (i.e. to one tenth the power) without having to adjust the VOLUME control. Use it when switching between different program sources, lowering the phono cartridge onto the record, etc. If your normal listening level has the VOLUME at about the '3' position, switch the AUDIO MUTING to -20 dB, and turn the VOLUME back up to compensate: this gives better results. Be careful, however, not to return AUDIO MUTING to NORMAL without reducing the VOLUME again.

#### ⑤ BALANCE Control

This controls the balance between the L and R stereo channels. It should normally be set at the central '0' position: turn it to the right (clockwise) to make the sound appear to come from the right-hand speakers, and to the left (counter-clockwise) to emphasize the sound from the left-hand speakers.

#### ⑥ LOUDNESS Control

In the ON position, this gives a more natural quality of sound at low listening volumes. It boosts the extreme low and high frequencies to compensate for our ears' reduced sensitivity to these frequencies at low volumes. It should be switched OFF when listening at high (loud) levels.

#### ⑦ OUTPUT LEVEL Meters

These sensitive, wide-range meters measure the output power for each channel from 0 to 100 watts. The minimum continuous rms output power of the CA-610 is 40 watts per channel with both channels driven into 8 ohms, but peak power can considerably exceed this. The watt reading is correct for 8 ohm speakers, but should be multiplied by two for 4 ohm speakers, and divided by two for 16 ohm speakers.

#### ⑧ BASS Tone Control With DEFEAT

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. The tone control only works when the DEFEAT switch is in the ON position. At 'DEFEAT,' the tone control is bypassed. You can compare directly the effect with and without the tone control by using this switch.

#### ⑨ TREBLE Tone Control With DEFEAT

This works similarly for the upper (treble) frequencies. Sometimes turning slightly to the left, to reduce treble 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. The DEFEAT control works in exactly the same way as the BASS defeat.

#### ⑩ SUBSONIC FILTER Switch

This switch enables you to cut out low frequency rumble which can arise from warped records, etc. Since it has hardly any effect on audible frequencies above 25 Hz, it can be left ON permanently with virtually no ill effects on normal audition.

#### ⑪ INPUT SELECTOR

This switch is used to select the program source of your choice, whether PHONO, TUNER, one of two tape decks (1 or 2), or AUX (for 8-track

tape cartridge, short-wave radio, etc.).

#### ⑫ STEREO/MONO Mode Selector

This switch lets you listen to stereo programs monaurally. It is useful in setting the BALANCE control: just switch to MONO and adjust BALANCE so that the sound comes from mid-way between the left and right speakers.

#### ⑬ REC OUT SELECTOR

This switch selects which of the programs connected to the CA-610 will be recorded. It works independently of the INPUT SELECTOR, so that you can listen to one program while recording any other, or record directly from one tape deck to another. At the OFF position the CA-610 is completely disconnected electrically from the tape recording terminals.

#### ⑭ SPEAKERS Switch

With this you can select either or both of two separate stereo pairs of speakers — or switch both OFF to enjoy headphone listening.

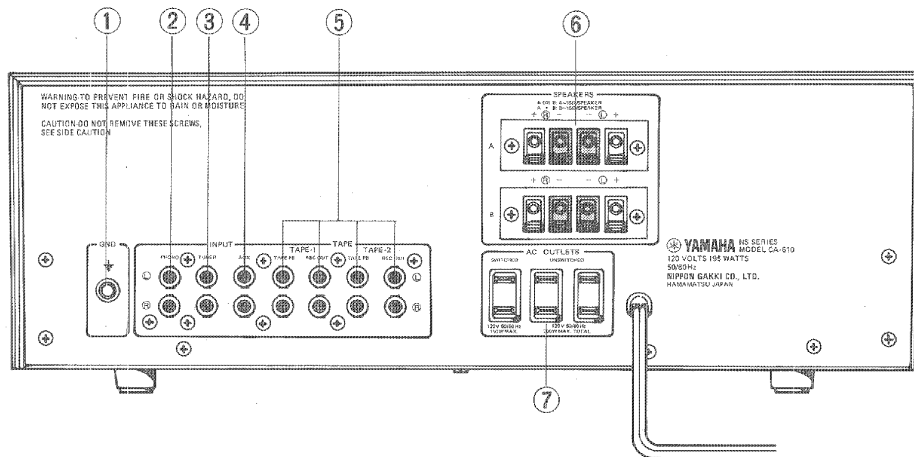
#### ⑮ PHONES Jack Socket

Plugging in headphones does not switch off the speakers automatically, so use the OFF position of the SPEAKER switch if necessary.

# CA-610

## REAR PANEL AND CONNECTIONS

### TYPE A MODEL



#### 1 AUX Terminals

Use these terminals to connect a second tuner or other item of audio equipment, etc. (See P.9)

#### 6 TAPE 1/2 REW and REC OUT Terminals

A total of two tape decks can be attached to these input and output terminals. Model Type E (see Page 7) is provided with DIN REC/PB sockets. These are an alternative, and are convenient if you have a tape deck with similar sockets, and the necessary connecting cable and plugs. When either DIN socket is in use, the corresponding pin terminals cannot be used. When not actually recording, protect the CA-610 against any effect of unused tape deck input impedances by setting the RECORD OUT SELECTOR to REC OUT OFF. Recording will, of course, be impossible.

#### 5 SPEAKER A/B Output Terminals

The upper set of terminals should be used first for your 'A' speakers, keeping the lower set for a second set 'B'.

#### 7 Spare AC OUTLETS

If your CA-610 is provided with spare AC OUTLET sockets (they are not available in certain areas) you can plug in other items of audio equipment. One socket is switched by the CA-610 POWER switch, and is suitable for tuners and other low power units requiring up to 150 watts. The other two are unswitched, and can only deliver a total of 200 watts. DO NOT exceed these limits.

#### 4 GND (Ground) Terminal

Ground terminals of turntable units and other components used with the CA-610 should be connected to this GND terminal, particularly if there is any audible 'hum' problem. Consult your local electrical dealer if you require detailed advice.

#### 2 PHONO Inputs

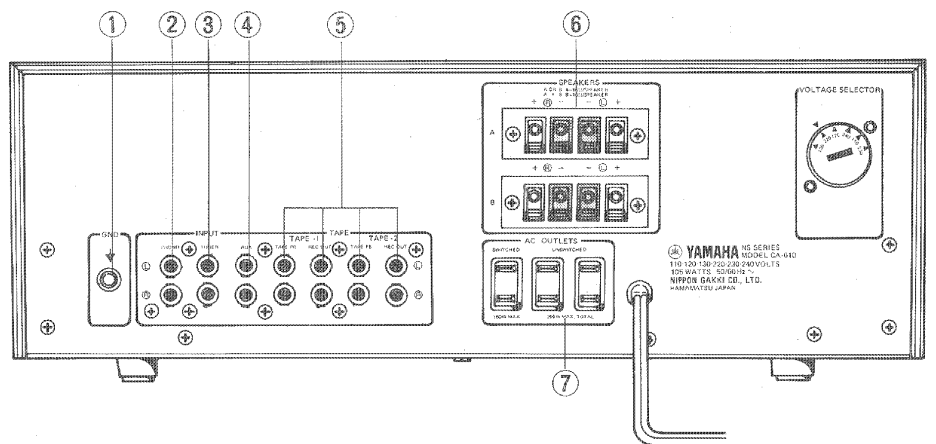
Connect the pin-jack cables from your turntable

unit to these terminals (the left channel sockets are uppermost for all CA-610 input terminals). All conventional moving magnet, induced magnet, etc., phono cartridges are suitable. Your dealer can advise. (See P.8)

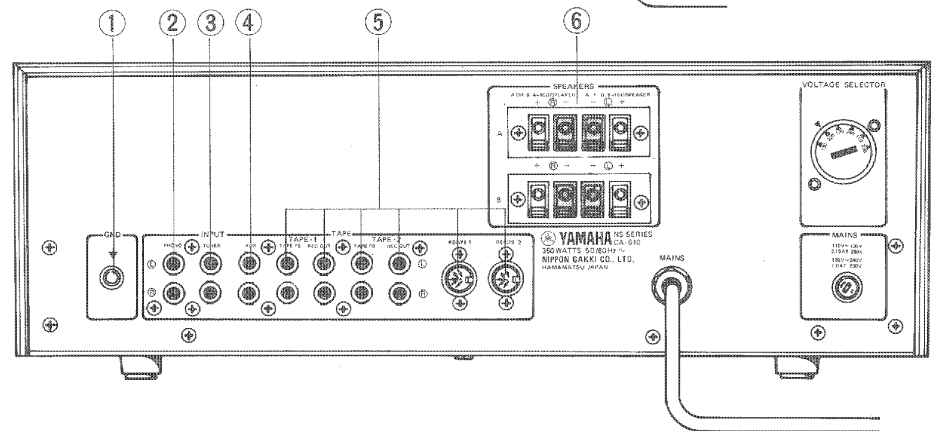
#### 3 TUNER Inputs

Connect your FM or other tuner to these terminals. If it has an adjustable output level, adjust this so that the volume does not change abruptly when switching from PHONO to TUNER. (See P.9)

TYPE B MODEL



TYPE E MODEL

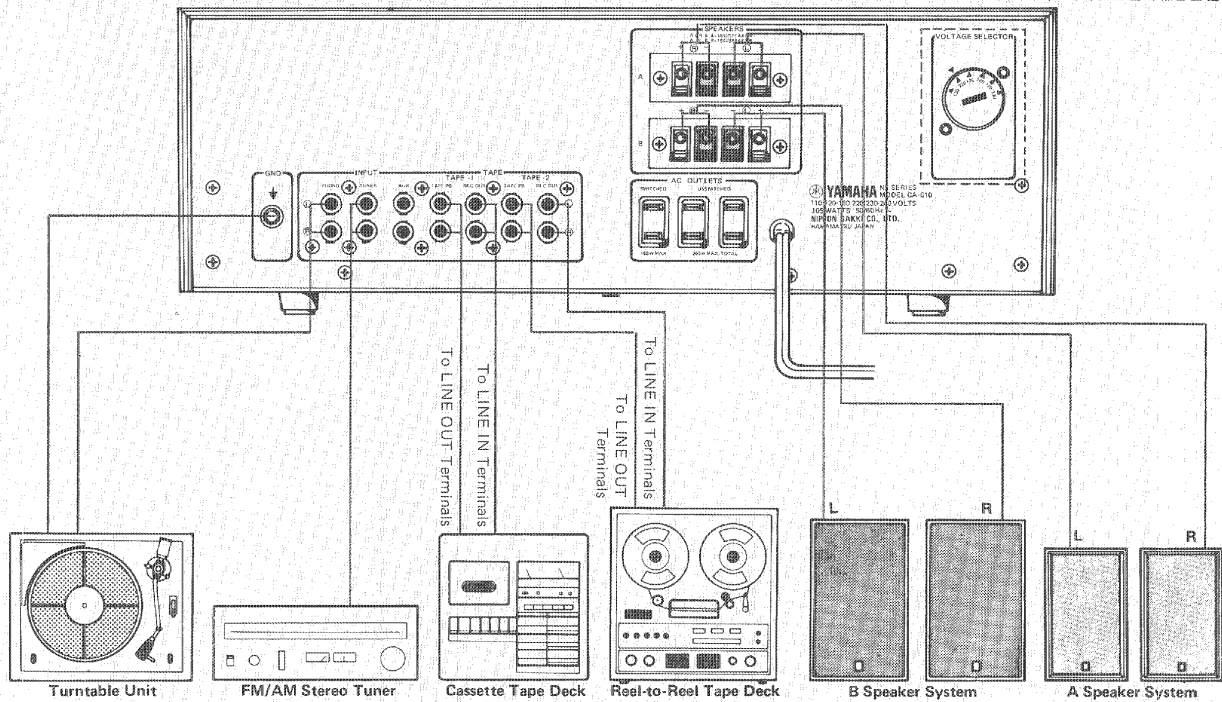


# CA-610

## CONNECTING AND OPERATING THE CA-610 WITH OTHER COMPONENTS

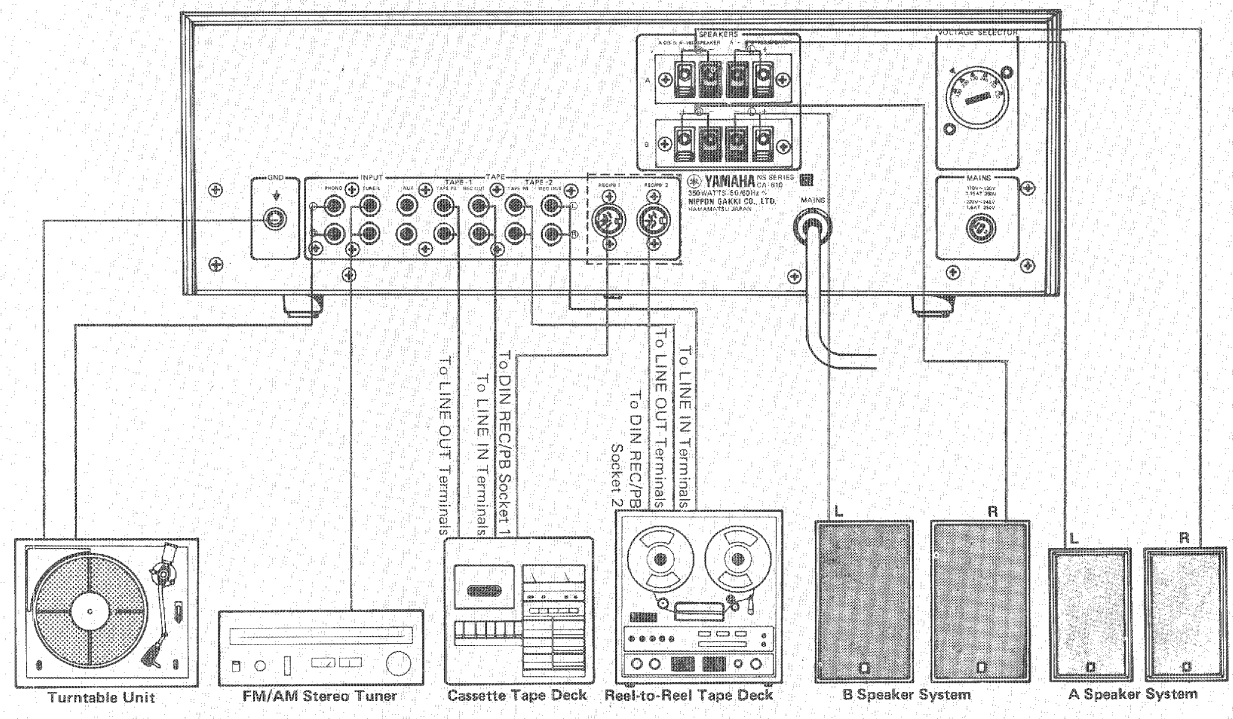
TYPE A, B\* MODELS

\* Note:  
Type B Models have the voltage selector shown inside the dotted line, see Page 3.



TYPE E\* MODEL

\* Note  
Type E Models have DIN REC/PB sockets are shown  
inside the dotted lines.



## SPEAKER CONNECTIONS

The CA-610 can handle two sets of stereo speakers (A and B), with selection of either, both, or neither, by the SPEAKERS switch on the front panel.

The CA-610 is designed for speakers with impedances between 4 and 16 ohms when connected to either A or B terminals. If both A and B speakers are operated at the same time, however, please use only 8 to 16 ohm speakers.

Use the OFF position when listening only to headphones, which should be plugged into the front panel jack socket. The speakers are not automatically disconnected by plugging in the headphones, and must be switched OFF separately.

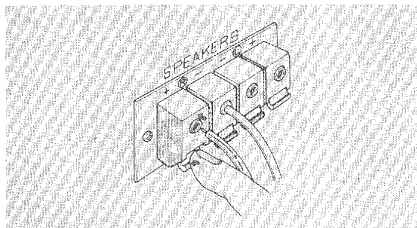
Use speakers which are rated to take the full 40 watts of CA-610 output power, or set the VOLUME and/or MUTING switch so that the rated maximum speaker input power is not exceeded, as indicated on the meter readings. Remember that with 4 ohm speakers the reading must be doubled (i.e. if the meters read 20 watts, the real power is 40 watts), and halved for 16 ohm speakers.

### Making the Speaker Connections

1. Strip the insulated covering from the speaker connecting cable for approx. half an inch, and twist any stray ends together. If possible, apply solder to the exposed half-inch. Push the lever beneath the terminal as shown in the diagram, and align the inner and outer terminal holes. Then insert the wire fully home. Release the

lever, and the wire end will be fully and firmly gripped, making a perfect connection.

2. Use the upper (A) speaker terminals first. Be careful that the terminals identified by the + and - signs above them are connected with the + and - terminals on the speakers. A mistake in this polarity can result in poor bass response and defective stereo image. Also be sure to connect the left-hand speaker to the LEFT speaker terminals and the right-hand to the RIGHT terminals.
3. Repeat this with the lower (B) terminals if a second pair of speakers is to be connected. In all cases make sure that connections are fully and firmly made, or you may not be able to get any sound from one or more speakers.



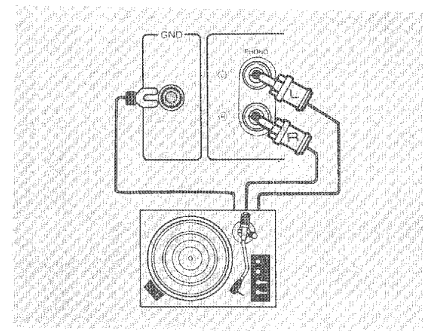
## CONNECTING A TURNTABLE AND TONE ARM UNIT

The output cable from the turntable unit should be connected to the PHONO terminals. Plug the pin jacks attached to the cables firmly into the terminal sockets, making sure that the left-hand cartridge output is connected to the

LEFT (upper) socket, and the right-hand to the RIGHT (lower) socket. Turntables are usually provided with a third, GROUND, line. Be sure to connect this to the GND terminal, screwing down the retaining nut firmly.

To enjoy record audition, turn the INPUT SELECTOR switch to PHONO, turn the VOLUME well down, and gently lower the cartridge stylus to the record surface. Raise the volume to the normal listening level, and note the setting. If you leave the volume normally at this setting, the AUDIO MUTING switch should be used to reduce volume when lowering the cartridge. Do *NOT* lower the cartridge at normal or high volumes or you may damage your speakers.

Use the SUBSONIC FILTER to cut out any low frequency rumble, and use the BASS and TREBLE controls to give the most acceptable tonal balance. At low listening volumes the LOUDNESS switch will give a more natural tonal balance in the ON position.



### LISTENING TO A TUNER

Connect the tuner output terminals to the CA-610 tuner input jack sockets using the pin-plug cable provided. Make sure that the left- and right hand outputs are connected to the proper input sockets.

To enjoy tuner audition, turn the INPUT SELECTOR switch to TUNER, and operate the tuner to receive FM or AM broadcasts. If your tuner generates unpleasant inter-station noise, use the AUDIO MUTING switch to reduce this while you are tuning.

If your tuner is provided with output level adjustment, use this so that there is no significant change in listening volume when switching the INPUT SELECTOR between TUNER and PHONO settings.

### USING THE AUX INPUT

This is a spare input for any stereo source, and has 150 mV sensitivity (the same as the TUNER input). Use it for Hi-Fi reproduction of TV sound, for 8-track stereo cartridge tapes, for short-wave radio reproduction, or for high output level PHONO cartridges (ceramic or other types — your dealer will advise). It can also be used with a microphone mixing amp. for live stereo recordings if you have a tape deck.

### TAPE DECK CONNECTIONS PLAYBACK/RECORDING

Two tape decks, 1 and 2, can be connected to the CA-610 at the same time. Any input source can be recorded on either 1 or 2, or on both at the same time. Copying ('dubbing') from 1 to 2, or from 2 to 1, is possible, and you are not restricted to listening to the source you are recording. You can, for instance, listen to the TUNER while dubbing a friend's tape, or listen to a record while recording an FM program for later audition.

Using standard pin-plug cables, connect the LINE OUTPUT terminals on the tape deck to the '1' TAPE PB terminals, and the LINE INPUT terminals on the tape deck to the '1' REC OUT terminals. Repeat with terminals '2' when you connect a second deck. Be careful to connect left- and right-hand channels correctly.

To enjoy tape audition, set the INPUT SELECTOR to TAPE 1 (or 2 as the case may be), and operate your tape recorder for playback. All tone and other controls on the CA-610 can be used to give the most acceptable tonal balance.

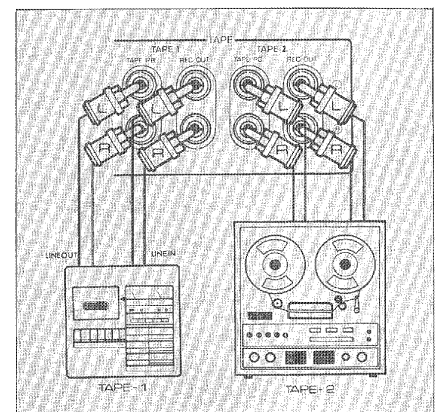
To make a tape recording on deck 1, 2, or both, set the REC OUT SELECTOR to the program source you wish to record (PHONO, TUNER, or AUX). Recording will then be possible on deck 1 and/or 2. If you have a three-head tape deck (most reel-to-reel decks have three heads, but very few cassette decks do), you will be able to 'monitor' the recording quality, comparing it directly with the original source, by switching the INPUT SELECTOR switch between the same

program source and the tape deck (1 and/or 2) being used.

To dub a recording from tape deck 1 to deck 2, set the REC OUT SELECTOR to TAPE 1 ► 2. The signal played back from 1 will be recordable on 2. If deck 2 is a three-head type, the quality of the recording can be monitored while it is being made by selecting TAPE 2 with the INPUT SELECTOR switch. Similarly, use the TAPE 2 ► 1 position for dubbing in the reverse direction.

Tone and other controls have no effect upon the signal being recorded. Corrections to tonal balance, etc., must be made during playback.

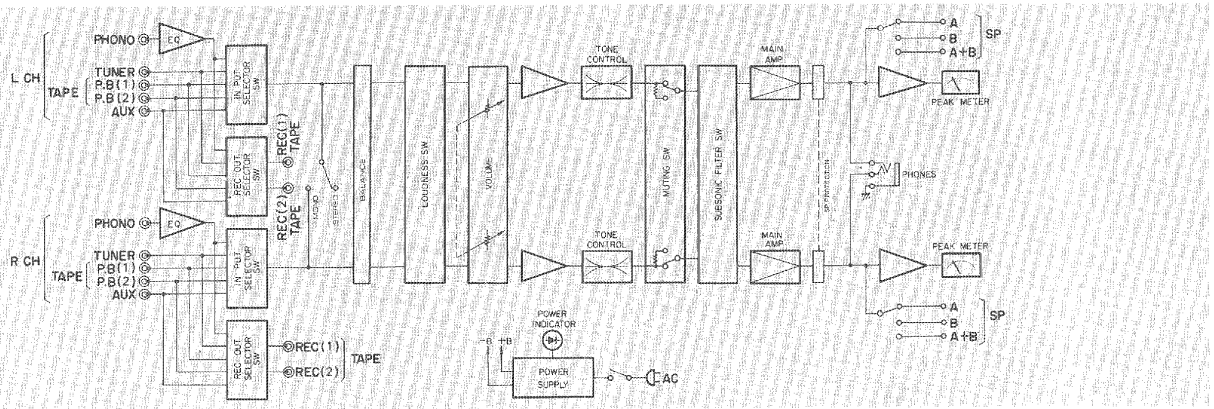
Only LINE INPUT and OUTPUT pin-jack connections are shown, but where the DIN REC/PB connector sockets are available, they may be used instead in the same way, with the one DIN plug replacing all four pin plugs.



# CA-610

## BLOCK DIAGRAM AND SPECIFICATIONS

### BLOCK DIAGRAM



### SPECIFICATIONS

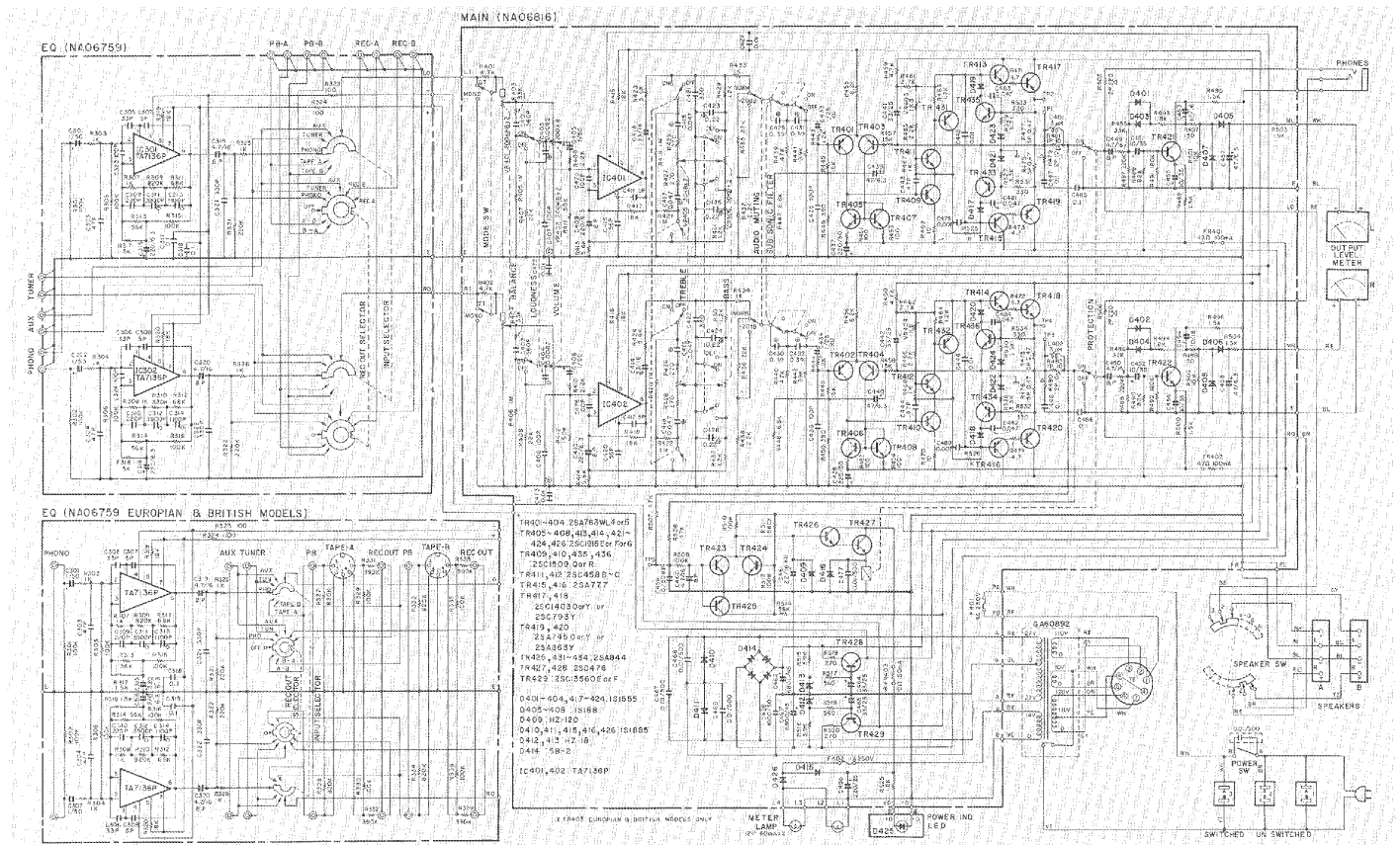
Continuous minimum rms power (both channels driven, at rated distortion, from 20 Hz to 20 kHz)	50 + 50 watts (into 4 ohms) 40 + 40 watts (into 8 ohms)
Total harmonic distortion (THD)	0.05% or less at rated output
Intermodulation distortion	0.05% or less at rated output
Power bandwidth (IHF, both channels driven)	10 Hz to 50 kHz
Damping factor	Better than 50
Output terminals	A, B, or A + B (by front panel switch)
Speaker impedance	4 to 16 ohms (A or B) 8 to 16 ohms (A + B)
Headphone impedance	4 to 16 ohms
Signal-to-noise ratio (IHF-A network, AUX)	90 dB
Residual noise (Pre + main amp, 8 ohms)	0.4mV
Input terminals	Sensitivity/impedance
Phono	2.5 mV/50 kΩ
Tuner, Aux	150 mV/50 kΩ
Tape PB (1,2)	150 mV/50 kΩ

Phono dynamic margin (at 1 kHz, 0.1% THD)	150 mV rms
Output terminals	Level/impedance
Tape Rec Out (1,2)	150 mV/1 kΩ
Tone controls	
Bass	±12 dB boost/cut at 50 Hz
Treble	±10 dB boost/cut at 10 kHz
Loudness control	
With volume at -30 dB	+9 dB at 50 Hz, +5 dB at 10 kHz
Subsonic filter	-3 dB at 25 Hz (12 dB/oct)
Audio muting	-20 dB
Semiconductors	4 ICs, 29 Transistors, 13 Diodes plus 3 Zener Diodes
Power supply	120 V AC 60 Hz Canada
	110, 120, 130, 220, 230, 240 V 50/60 Hz Other Areas
Power consumption	105 watts (+350 watts max. via spare AC outlets)
Dimensions (W x H x D)	435 x 150 x 298 mm
	17-1/8" x 6" x 11-3/4"
Weight	8 kg (17.6 lb)

Specifications subject to change without notice.

# CA-610

## SCHEMATIC DIAGRAM



# CA-610

## TROUBLE SHOOTING

Before assuming that your CA-610 is faulty, check the following trouble-shooting list, which details corrective action you can take yourself, without having to call a service representative.

Fault	Cause	Cure
No power although POWER switch is ON (POWER LED unlit)	AC power line not plugged into supply socket. AC main fuse has blown.	Plug firmly into the supply socket. Replace fuse and contact service rep. if it blows again.
No sound although power is connected	Volume set to $-\infty$ INPUT SELECTOR in wrong position Input pin plugs incorrectly inserted, loose, or disconnected. Speaker connections faulty SPEAKER switch in OFF position	Turn up VOLUME. Check and change as necessary. Check and insert fully in the correct positions. Check and make good. Set to correct position (A, B, or A + B).
Sound comes only, or mainly, from either L or R speaker.	Speaker connections faulty Input connections faulty Balance control not properly adjusted	Check and make good. Check and make good. Set to give correct stereo balance.
Sound suddenly ceases during audition.	The protective circuit has detected $\pm 2$ V DC at the speaker terminals, and disconnected them.  AC main fuse has blown.	Sound will be restored as soon as the fault clears. If the fault persists, switch OFF and wait briefly before switching ON again. Replace fuse and contact service rep. if it blows again.
Poor bass response and badly defined stereo image	Speaker phase polarity ( $\pm$ connections) incorrect	Reverse the connections to one speaker (not both).
A loud 'humming' is heard instead of the record when attempting phono audition.	Either the pin-plugs from the phono cartridge are not firmly plugged into the input sockets, or the braided shielding wire is defective.	Plug in firmly, replacing the faulty shielding if necessary. Check and make good the GND (ground) wire.
The VOLUME cannot be raised during record audition without a loud 'booming' noise.	This is caused by acoustic feedback from the speakers to the phono cartridge stylus.	Increase the separation between turntable unit and speakers, avoiding locations directly in line with the speakers.
The VOLUME is inadequate even when fully raised.	The AUDIO MUTING switch is ON.	Reduce the VOLUME first, then switch AUDIO MUTING OFF.
Bass and treble frequencies are unnatural and exaggerated.	The LOUDNESS switch is ON.	Switch OFF except at low listening levels.



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