

# YAMAHA CA-810

Integrated Stereo Amplifier

## Owner's Manual

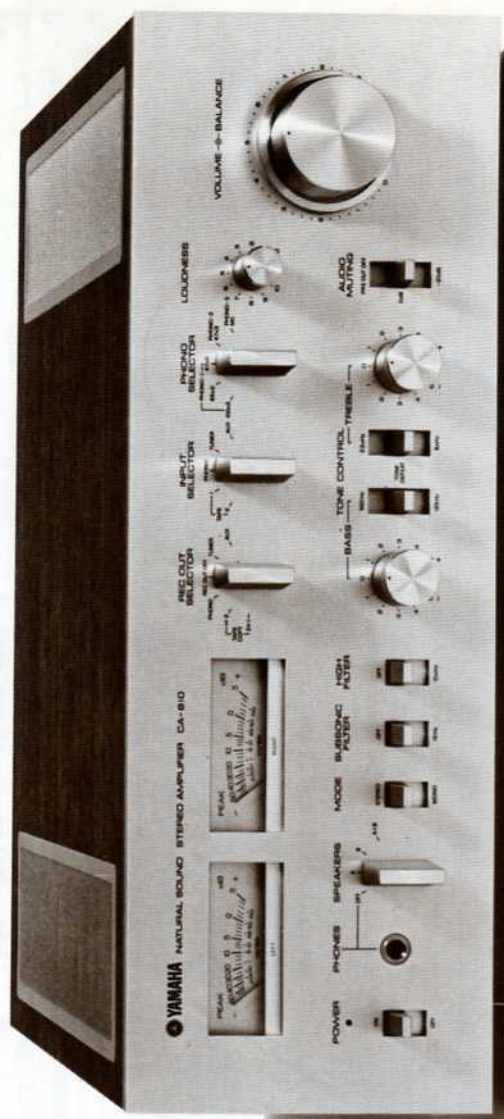
### IMPORTANT!

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

Model Name CA-810  
Serial No. \_\_\_\_\_

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

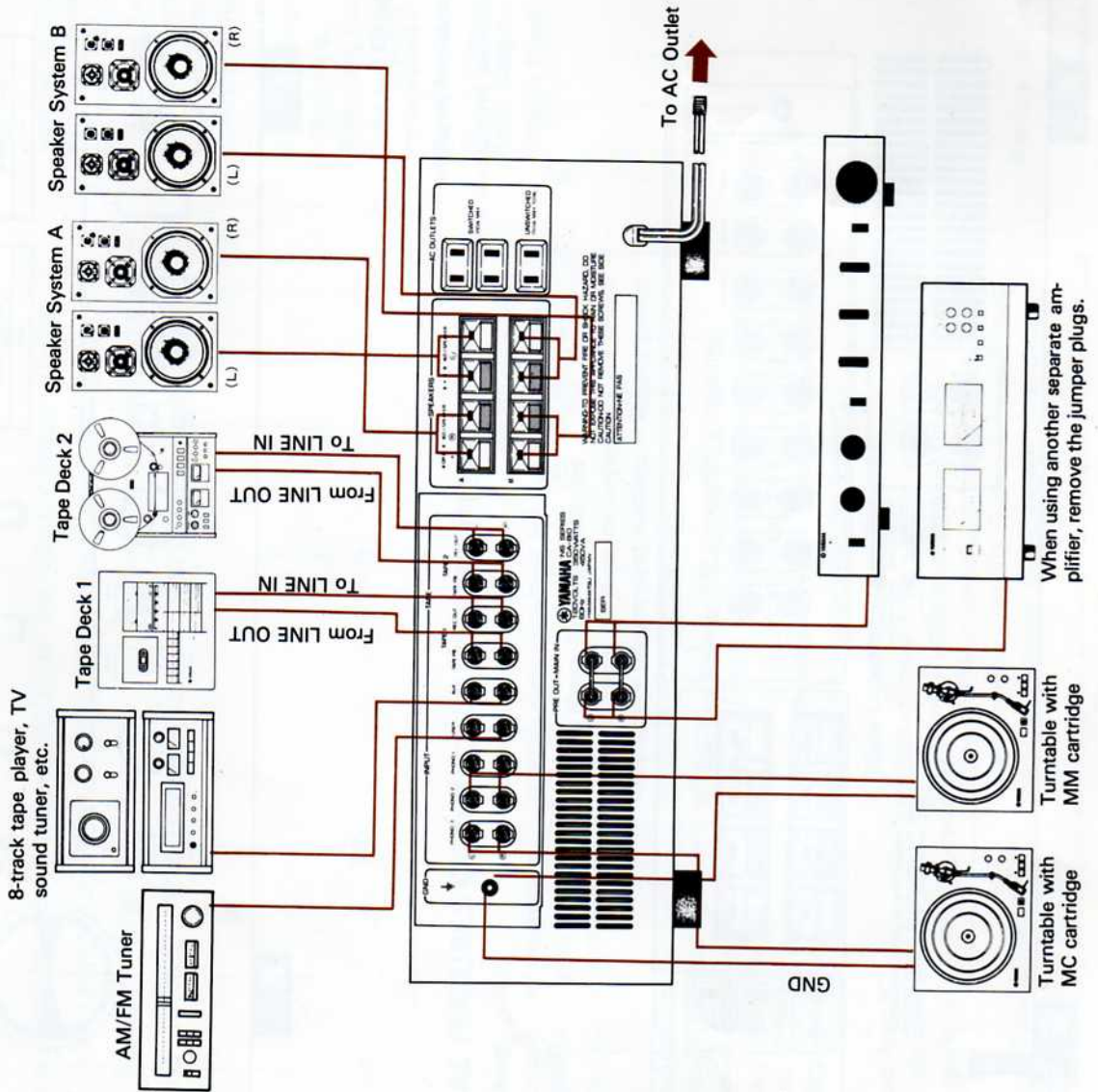
Retain this Owner's Manual in a safe place for future reference.

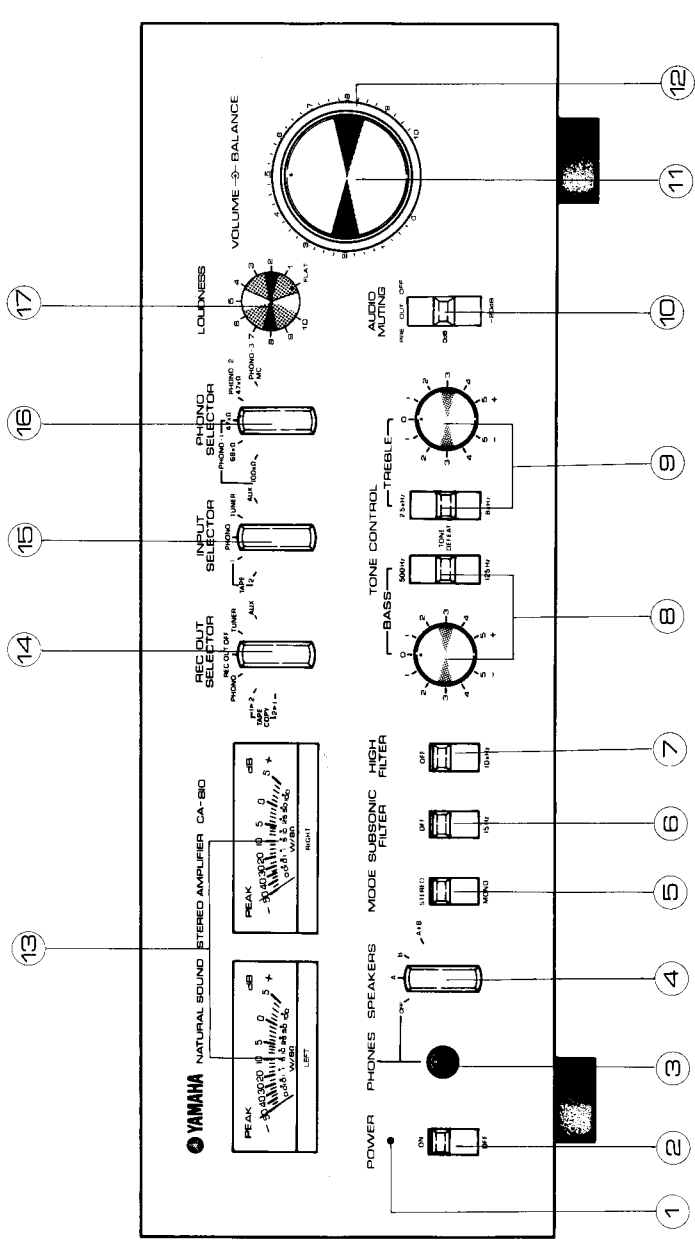


U/C

# CA-810

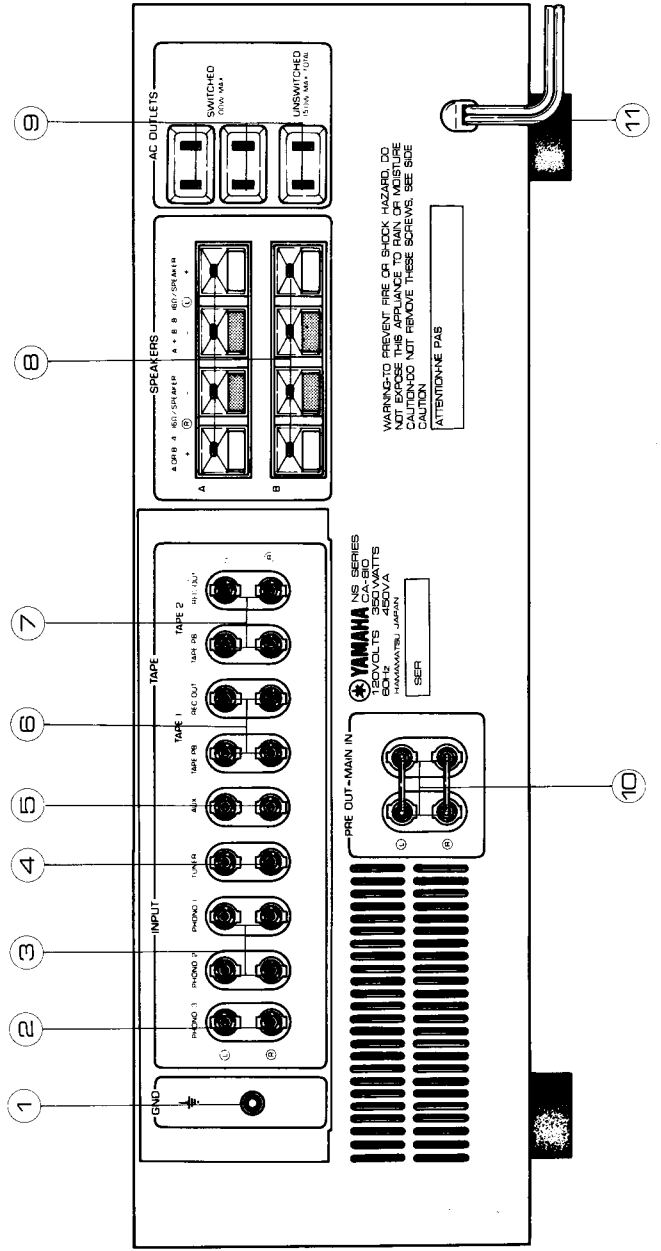
## CONNECTION DIAGRAM





▲ The front panel numbers are explained on pages 6 — 7.

▼ The rear panel numbers are explained on pages 8 — 9.



# CA-810

## CONTENTS AND FEATURES

*YAMAHA offers you thanks and congratulations on your choice of the CA-810 integrated stereo amplifier. Embodying novel and useful features, it combines the very highest audio quality with the greatest convenience in use, and is currently setting new standards for integrated amplifier performance.*

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### SPECIAL FEATURES OF THE CA-810 AMPLIFIER

- 1. Low Distortion Power Amp**  
This ultra-low distortion amplifier incorporates a primary stage transistor differential amp and final stage SEPP complementary OCL circuitry with a PC limiter.
- 2. Superb Phono Equalizer Amplifier**  
The equalizer uses specially matched Yamaha low noise FETs in a differential amplifier first stage and features complementary SEPP output stage configuration to give an S/N of 95 dB and phono dynamic range up to 230 mV and RIAA deviation within  $\pm 0.3$  dB.
- 3. Ultra Low Noise MC Head Amp IC**  
This offers S/N comparable with that obtained by conventional equalizer amplifiers for high output MM cartridges.
- 4. Low Noise, Low Distortion Tone Control Amp**  
First stage differential FET amplifier and complementary SEPP output stage in the NF-type tone controls gives extremely low noise and distortion.
- 5. Wide Range Peak-Level Meters**  
In addition to their calibration in dB, these meters offer independent readings of output power in Watts (for 8-ohm speakers).
- 6. Rec Out Selector for Expanded Versatility**  
The Rec Out selector provides double use from your CA-810, letting you record one program source even while you are listening to a completely different program through the speakers.
- 7. Many Other Important Features**  
Built-in relay type speaker protector circuits. Continuously adjustable Loudness control. Audio Muting. Pre/Main Switch, and many others. Wide range of auxiliary circuits. Superb Yamaha Natural Sound performance. Clean, elegant panel design.

Warning: to prevent fire or shock hazard, do not expose this set to rain or moisture.

# CA-810

## CAUTIONS-READ THIS BEFORE OPERATING YOUR CA-810

1

The CA-810 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 CA-810, which is a precision electronic instrument.

3

Do not place the CA-810 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 CA-810 is faulty before checking the Trouble Shooting list on page 21 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 CA-810 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

Always check the main VOLUME setting before returning the AUDIO MUTING switch to the 0 dB position. The sudden increase in level is enough to damage most speakers with the high output power which the CA-810 provides if the original level was too high.

11

Keep this manual in a safe place for future reference, and refer to it frequently until you are perfectly familiar with all CA-810 controls and functions.

12

To avoid burning out the fuse, be sure to check its rating before turning on the power.

# CA-810

## FRONT PANEL AND CONTROLS

### ① POWER ON Indicator

This LED lights when power is being supplied to the amplifier.

### ② POWER ON/OFF Switch

Switch ON to connect the main electrical supply. Leave OFF while familiarizing yourself with the controls, and while connecting other audio equipment.

### ③ PHONES Jack

One headphone jack is provided. Plugging the headphone in does not mute the speakers, so use the OFF position on the SPEAKERS switch.

### ④ SPEAKERS

With this control, you can select either or both of two pairs of stereo speakers, or switch them all off so that you can enjoy headphone listening.

### ⑤ MODE Switch

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.

### ⑥ SUBSONIC FILTER

This switch enables you to cut out low frequency rumble which sometimes arises from warped records. In general, since this control has almost no effect on audible frequencies above 15 Hz, it can be left in the ON position permanently with virtually no adverse effects on the normal sound output quality.

### ⑦ HIGH FILTER

This switch allows you to utilize a high frequency, steep cut-off filter which takes effect at 10 kHz.

### ⑧ TONE CONTROL-BASS

This BASS tone control is provided so that you can emphasize low frequency sounds, or to reduce them, depending on the tonal balance that you require. The three-position switch located next to the bass control knob

provides a DEFEAT position which permits you to listen to the sound output either with or without the effect of the tone control. In addition, this switch allows you to choose between a turnover frequency of 125 Hz or 500 kHz.

### ⑨ TONE CONTROL-TREBLE

This TREBLE tone control functions for the high frequencies as the BASS tone control does for the low frequencies. It also has a three-position switch permitting DEFEAT and turnover frequency selection. In this case, the turnover frequencies available are 2.5 kHz and 8 kHz.

### ⑩ AUDIO MUTING Switch

When this three-position switch is in the middle, 0 dB position, the amplifier functions normally. When the switch is placed in the -20 dB position, a straight 20 dB reduction in listening volume is achieved without any need to vary the VOLUME control setting. This is used whenever operating switches and when lowering the phono cartridge onto the record. Setting the switch to the PRE OUT OFF position completely isolates the main amplifier from all inputs, thus allowing you to make and break various connections to this stereo amplifier without risking damage to the speakers by very large transient outputs.

#### ⑪ VOLUME Control

Use this control to give the volume of sound that you require. Always start with the knob turned fully to the left (counter-clockwise) at the "0" position, before turning it up to the full volume level that you want to hear. If you wish to maintain the same volume level after pausing to change records or to answer a telephone, use the AUDIO MUTING switch to mute the sound temporarily, and then switch back to the level that you have set with the VOLUME control.

#### ⑭ REC OUT SELECTOR

This switch selects which of the programs connected to the CA-810 will be recorded. It works quite independently of the INPUT SELECTOR control, so that you can listen to any one program while recording any other. Alternatively, you can record directly from one tape deck to another. In the REC OUT OFF position the CA-810 is completely disconnected electrically from the tape recording terminals.

positions for the normal Moving Magnet (MM) cartridges: the standard 47 k $\Omega$  and also 68 k $\Omega$  and 100 k $\Omega$ . The PHONO 2 position allows the use of a standard 47 k $\Omega$  MM cartridge.

Special precautions taken with the head amplifier IC circuitry make it possible for the low level 60  $\mu$ V input to the MC phono input terminals to be switched, which is normally very difficult to accomplish without hum and switching noise.

#### ⑫ BALANCE Control

This control adjusts the balance between the left and the right stereo channels. Set it to the center "5" position, at which there is a click stop, unless you wish to emphasize the sound from one speaker in contrast to that of the other speaker.

#### ⑮ INPUT SELECTOR

This switch is used to select the program source of your choice for audition. Switch positions are available for Phono, Tuner, Aux., and two tape decks. Remember, the INPUT SELECTOR switch selects which program input you can listen to on the speakers or on the headphones, while the REC OUT SELECTOR selects which program source you will record.

#### ⑰ LOUDNESS Control

This boosts the extreme low and high frequencies to compensate for our ears' reduced sensitivity to these frequencies at low volumes. Set it to the FLAT position while the VOLUME control is set to your normal listening level. Turning it counterclockwise will reduce the volume but retain the natural balance between low and high frequencies.

#### ⑱ PEAK Meters

These meters indicate the output from the left and right channels. These meters have logarithmic scales; they range from 0.5 mW to 158 W (8 $\Omega$ ) (-50 dB to +5 dB).

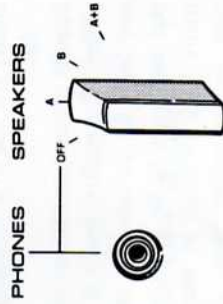
#### ⑲ PHONO SELECTOR

In the PHONO-3MC group of options, it is possible to select the use of a Moving Coil (MC) cartridge. With the switch in this position, the internal Head Amplifier IC is operational. Also provided are three impedance

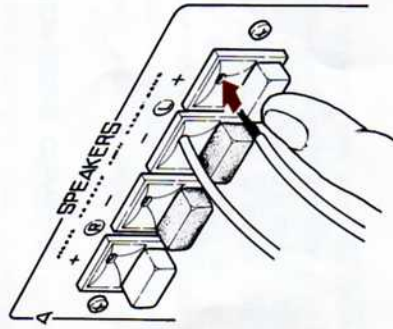
# CA-810

## REAR PANEL AND CONNECTIONS

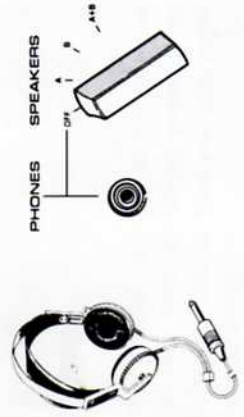
The Speaker Switch



Making Speaker Connections



Headphone Connection



### 1 GND (Ground) Terminal

The GND terminal is provided for grounding auxiliary units such as turntables. Make certain that all such units are firmly grounded; failure to connect the ground leads can result in unpleasant hum.

### 4 TUNER Terminals

Connect your FM or other tuner to these terminals. If the tuner has an adjustable output level, adjust this level so that the volume does not change suddenly when switching from PHONO to TUNER. Make certain that the INPUT SELECTOR on the front panel is in the TUNER position for audition.

### 2 PHONO 3 Terminals

These jacks are for connecting a turntable using an MC (moving coil) cartridge. The upper jack is for the left channel, the lower for the right. The same is true for all the other pairs of jacks.

### 5 AUX Terminals

Use these terminals for connecting a second tuner, or another piece of audio equipment. For example, it can be used with a microphone mixing amplifier for live stereo recording if you have a tape deck. Make certain that the INPUT SELECTOR is in the AUX position for this function.

### 3 PHONO 1, 2 Terminals

These jacks are for connecting turntables using MM (moving magnet) cartridges. Connect the turntable you will use most often to Phono 1. Phono 2 is a spare set of jacks, with interference-preventing short plugs inserted at the factory. When you want to use these jacks, first remove the plugs.

### 6,7 TAPE PB and REC OUT Terminals

Two tape decks can be connected to these input and output terminals. Recordings can be made on both tape decks at the same time, and tapes can be dubbed from one tape deck to the other, in either direction, according to the REC OUT SELECTOR switch, and independent of the source being auditioned.



## 8 SPEAKERS Terminals

Two sets of speaker terminals are provided on the rear panel, for A and B speaker systems. Either, both, or neither can be selected via the front panel SPEAKERS switch. Only use speakers with impedances of 8 ohms or more if you listen to A and B systems together. Use the OFF position when listening with headphones.

(1) Make sure that you connect the + terminal on the CA-810 to the + terminal on the speaker, and the - terminal on the CA-810 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.

(2) To connect the speakers, push the lever beneath the terminals as shown in the diagram, align the inner and outer terminal holes, and insert the speaker wire into the holes. Then release the lever, which clamps the wire.

(3) Repeat with the B terminals if you wish to connect a second pair of speakers. In all cases check for a firm grip. Without good connections one or more speakers may fail to operate.

## 9 AC OUTLETS

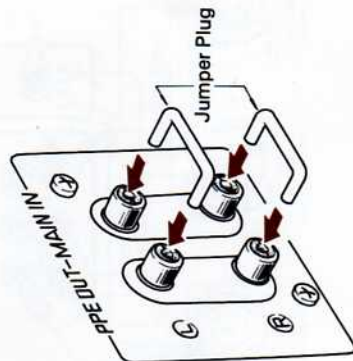
The upper two outlets are controlled by the CA-810 POWER switch on the front panel. They have a maximum rated capacity of total 100 Watts. The bottom outlet with a maximum capacity 150 Watts, is unswitched. *Do not* exceed the maximum ratings.

## 10 PREOUT-MAIN IN Terminals

The CA-810 preamp and main amp sections can be used independently, via these jacks. For normal operation, short plugs should be inserted in the jacks.

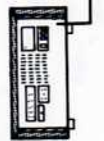
## 11 AC Mains Cords

The Coupler



Power Supply Connections

POWER

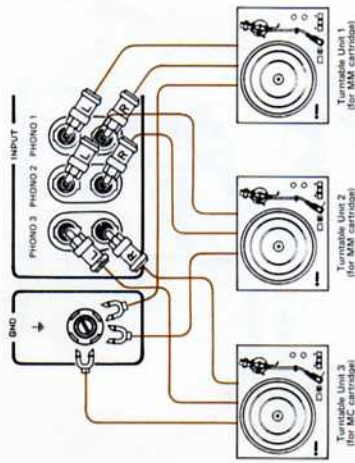


AC Main Supply Socket

# CA-810

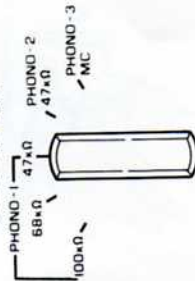
## LISTENING TO RECORDS

Record Player Connection



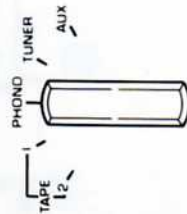
PHONO SELECTOR Switch

### PHONO SELECTOR



INPUT SELECTOR Switch

### INPUT SELECTOR



Note that the PHONO 2 terminals can only be used with MM cartridges suitable for 47 kΩ impedance.

Also note that PHONO input plugs should never be connected or disconnected without either switching the MUTING switch to PRE OUT OFF, or the POWER switch OFF.

Use the -20dB position of the AUDIO MUTING switch to cut the volume instantly by 20 dB while changing records or altering the PHONO switch, without having to turn down the volume each time.

Do not connect the MM cartridges to the PHONO 3 jacks: you will overload the head amplifier and produce quite unacceptable levels of distortion.

If you play monaural records, the signal-to-noise ratio will be improved if you turn the MODE selector switch to the MONO position.

Do not lower the cartridge at normal or high volumes, or you may damage your speakers. Use the FILTERS to remove rumble and/or scratch noise, and the BASS and TREBLE controls to give the best tonal balance.

## CONNECTING A TURNTABLE UNIT

The main AC supply plug of your turntable unit may conveniently be inserted into the spare AC outlet socket controlled by the CA-810 POWER switch. The output lead from the turntable unit should be connected to the PHONO 1 terminals, keeping the PHONO 2 terminals as spares. If you wish to use an MC cartridge, connect to the PHONO 3 jacks. Check that the L and R pin plugs have been correctly inserted. Do not forget to connect the turntable ground line to the GND terminal on CA-810.

Switch on the POWER switch, and set the INPUT SELECTOR to PHONO, then select the appropriate position of the PHONO selector: MC if you use a moving coil cartridge, and 47 kΩ if you use a moving magnet cartridge. The 47 kΩ is best with many MM cartridges, but some will sound better if you use the 68 or 100 kΩ. Follow the cartridge-maker's recommendations, or in the absence of these, see which setting gives the best tonal balance. The differences are quite subtle.

# CA-810

## TUNER AND AUX

### TUNER CONNECTIONS

Connect the tuner output terminals to the CA-810 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 sockets.

To enjoy your tuner, turn the INPUT SELECTOR switch to the TUNER position, and operate the tuner to receive the desired AM or FM signal. If your tuner generates unpleasant inter-station noise, use the AUDIO MUTING switch on the front panel of the CA-810 to reduce this while you are tuning.

If your tuner is provided with an output level adjustment control, locate the proper position of the control to ensure that there is no significant change in the listening volume when you switch between the TUNER position and the PHONO position with the INPUT SELECTOR.

If you wish to record directly from your FM tuner onto an auxiliary tape deck, attach the tape recorder to the REC OUT jacks on the rear panel of the CA-810, and turn the REC OUT SELECTOR to the TUNER position. Remember, while you are recording, you can listen to a different music source by using the INPUT SELECTOR control.

### AUXILIARY INPUT CONNECTIONS

This is a spare input for any sound source you wish to connect to the CA-810. When connecting a stereo source to these terminals, insure the left-hand and the right-hand plugs are inserted in the proper jacks.

This input has a sensitivity of 150 mV and can be used for such inputs as Television Sound, Eight Track Stereo Cartridge Tapes, Shortwave Radio reception, and for high output level PHONO cartridges (ceramic or other types: ask your dealer's advice when using these cartridges).

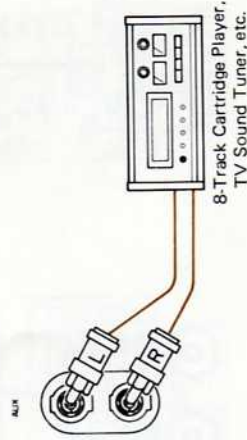
It can also be used with a microphone mixing amplifier for live stereo recordings if you have suitable equipment. In using these auxiliary units, make sure that they are compatible with the input impedance of 50 k $\Omega$  for these terminals.

To listen to these auxiliary sound sources, set the INPUT SELECTOR to the AUX position, and to record them set the REC OUT SELECTOR to the AUX position. Remember, when using a monaural input signal, the MODE selector switch should be set to the MONO.

### Tuner Connections

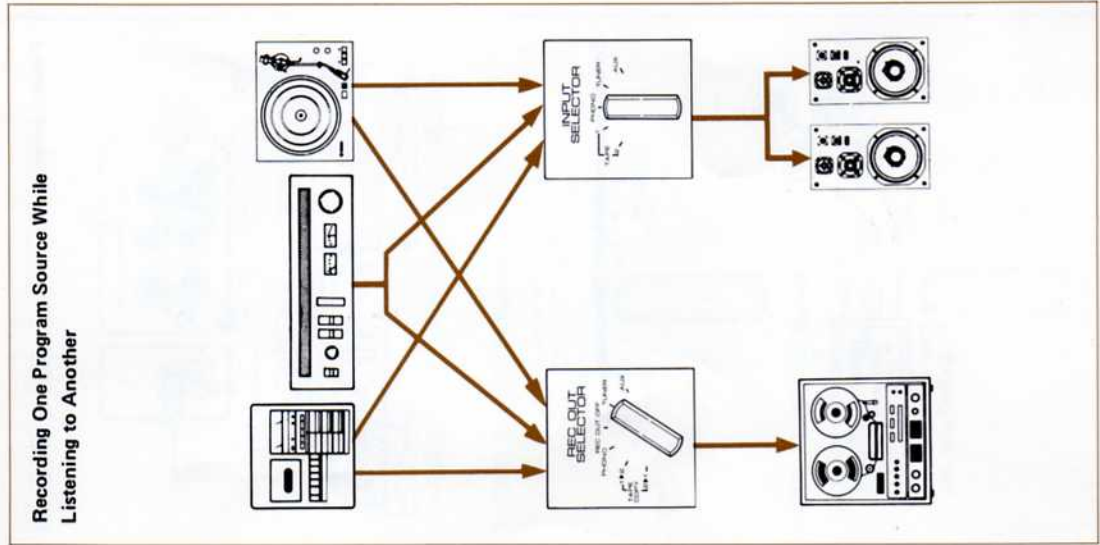


### Connections to the AUX Terminals



# CA-810

## REC OUT SELECTOR, TAPE PLAYBACK AND RECORDING



### REC OUT SELECTOR SWITCH

Do not confuse the REC OUT SELECTOR and the INPUT SELECTOR switches. The INPUT SELECTOR switch decides which program source you hear. The REC OUT switch decides which one you record. Yamaha amplifiers are at present unique in offering independent choice of audition and recording. Thus you can listen to a record while tape recording direct from an AM/FM tuner, or while dubbing from one tape recorder to another (set the INPUT switch to PHONO and the REC OUT to TUNER, TAPE 1▶2, or TAPE 2▶1 positions). Alternatively you can tape record a disc while listening to FM broadcast or a music tape played back on a second tape deck (be careful not to infringe copyright laws in tape recording proprietary material). Just set the REC OUT switch to PHONO and the INPUT switch to TUNER or TAPE (1 or 2) respectively.

With the REC OUT SELECTOR in the OFF position, the CA-810 is completely disconnected from the recording output terminals. Thus, when you are not recording, the CA-810 will be protected from any adverse effects of unused tape deck input circuit impedances. Use this position when not recording.

### TAPE PLAYBACK

The output leads provided with the tape deck are used to connect the LINE output terminals to

the CA-810 TAPE PB terminals. Use the TAPE 1 terminals for your main deck. Use the TAPE 2 terminals for a second deck or as a spare pair. Set the INPUT SELECTOR to TAPE 1 to play back tapes (or to TAPE 2 if you are using the TAPE 2 terminals, of course). Use the output level controls on the deck or decks to adjust the playback level so that there is no great change in volume level when switching between TUNER and TAPE 1 or 2 inputs.

### TAPE DECK CONNECTION/RECORDING

The tape-deck leads provided are used to connect the deck LINE input terminals to the REC OUT terminals. Again, you should use the TAPE 1 terminals for your main deck, keeping the TAPE 2 terminals for a second or spare pair. Note that the INPUT SELECTOR switch setting has *no effect whatever* upon the signal which will be recorded via these terminals. The REC OUT terminals' signal is decided by the REC OUT selector switch. If you refer to the description of the REC OUT function you will see that recording of any of the program sources connected to the CA-810 is possible: just set the REC OUT switch to TUNER, PHONO, or AUX, respectively.

Recording of any of these sources can proceed while that source, or any other, is selected for audition by the INPUT SELECTOR switch. Monitoring of the recording while it is in progress can be carried out, if you are using a three-head deck

designed for monitoring, by setting the INPUT SELECTOR switch to the TAPE position, 1 or 2, via which you are recording. (Note: most cassette tape decks have only two heads, and monitoring is impossible; most open-reel decks do have three heads, with one for monitoring.)

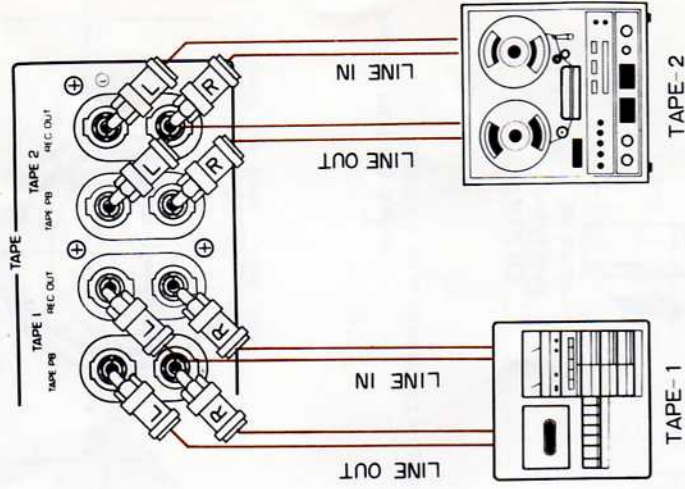
The level at which a recording is made is very important (see the instruction manual provided with your tape recorder). Adjustments in level should normally be made with the input level controls on the tape deck.

Tone, level, and other controls have no effect on the signals being recorded via REC OUT terminals. Tonal corrections must be made during playback.

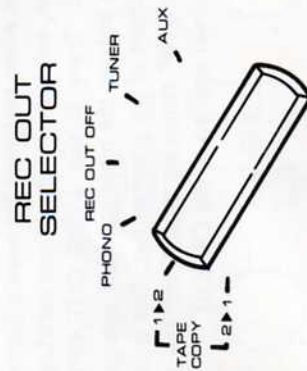
### TAPE TO TAPE DUBBING

For this you will need two decks. Check carefully that the L (left) and R (right) channel pin-jacks are correctly connected before commencing recording. To copy a tape from TAPE 1 to TAPE 2 terminals, use the TAPE 1▶2 setting on the REC OUT selector switch. Similarly, to copy from TAPE 2 to TAPE 1, use the TAPE 2▶1 setting. In both cases you can compare the original recording and the copy by switching the INPUT SELECTOR between the TAPE 1 and TAPE 2 settings (provided that you have decks which allow you to monitor). Once you are satisfied that the recording is proceeding satisfactorily, you can turn the INPUT SELECTOR switch to any other program source you wish to enjoy, and the recording will not be affected.

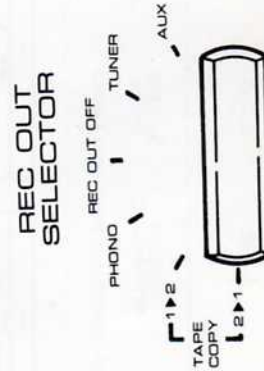
### Tape Deck Connections



Tape Dubbing (1▶2)



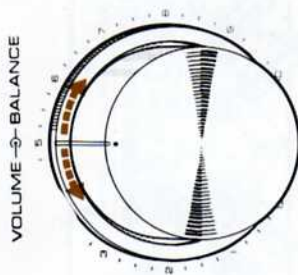
Tape Dubbing (2▶1)



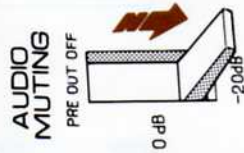
# CA-810

## METERS AND LEVEL CONTROLS

VOLUME (the Inner Knob) and  
BALANCE (the Outer Ring) Controls



AUDIO MUTING Switch



## METERS

The peak meters used in the CA-810 have a very fast response, enabling them to follow instantaneous variations in signal level rapidly and accurately. They also have an extremely wide measurement range, going from -50 dB to +5 dB on a single scale, with 0 dB corresponding to 100 Watts output into 8-ohm speakers. The calibration in Watts runs from 0.5 mW up to 158 Watts. Note that these readings should be doubled for 4-ohm speakers, and halved for 16-ohm speakers.

## VOLUME, BALANCE AND MUTING

Use the VOLUME control to provide the volume of sound output that you require. When switching on your CA-810, always set the VOLUME control at the "0" position by rotating the knob fully counter-clockwise. Then increase the volume as required. The BALANCE CONTROL adjusts the balance between the left-hand and the right-hand stereo channels. With the control set at the central "0" position, the sound should appear to be balanced centrally between the two speakers. When the control is rotated clockwise, it will emphasize the sound from the right-hand speaker, and when it is rotated counter-clockwise, it will emphasize the sound from the left-hand speaker.

The AUDIO MUTING control can be used to introduce a straight 20 dB reduction in signal level (a drop to one-tenth the unswitched power) without having to use the VOLUME control. This is used when switching between different program sources, and lowering the phono cartridge onto the record. There is also a PRE OUT OFF position which isolates the main amplifier completely from the output of the preamplifier. This is useful when inserting or removing plugs into the rear panel with power applied to the CA-810.

The Peak Level Meters



# CA-810

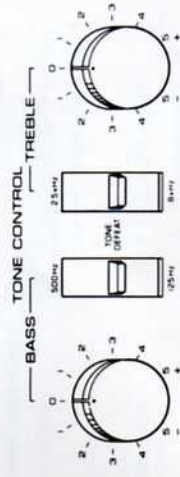
## TONE AND FILTER CONTROLS

### TONE CONTROLS

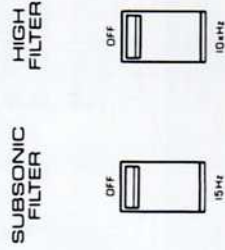
Both TREBLE and BASS tone controls on the CA-810 are provided with twin turnover frequencies and an intermediate DEFEAT position. In this position, the signal passes through the amplifier without being affected by the tone controls at all. It provides an instant comparison between the effect with, and without, the control setting you have chosen.

Turnover frequencies are either 125 or 500 Hz for the BASS control and either 2.5 or 8 kHz for the TREBLE. Start with the 125 Hz and 8 kHz positions. If adequate control cannot be obtained with these settings, try the 500 Hz and 2.5 kHz positions, which extend the effect of the tone controls well into the important central frequency range as shown in the graphs. If you listen at very low volumes, you may find that you need quite high degrees of bass and treble boost to give a natural tonal balance.

### The TONE CONTROLS



### The SUBSONIC and HIGH Filters



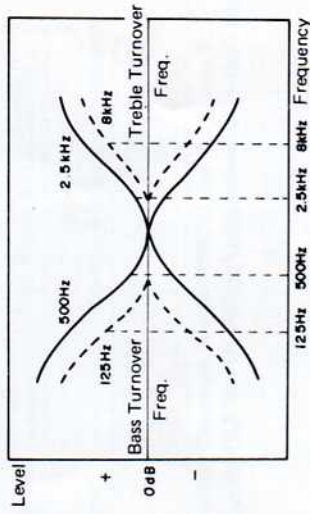
### FILTERS

The filter circuits of the CA-810 offer a choice of SUBSONIC and HIGH filters. Both provide very steep attenuation curves with a slope of 12 dB/octave. This sharp slope is achieved with extremely low distortion so that there is minimum degradation of tonal quality in the important mid-range frequencies.

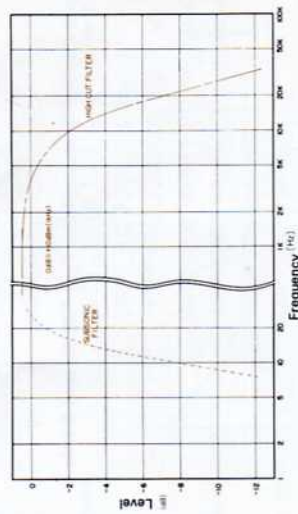
The SUBSONIC FILTER operating below 15 Hz prevents the amplification of ultra low frequency signals, arising from warped or eccentric records, from giving rise to cross-modulation distortion (general lack of clarity), and protects the speakers from overloads. Since the filter has virtually no effect on audible frequencies above 25 Hz, it can be left ON permanently with no effect on normal audition.

The HIGH FILTER operates at frequencies above 10 kHz, and is used to cut out unwanted tape hiss and record scratch. It should not be used unnecessarily.

### Tone Response Characteristics



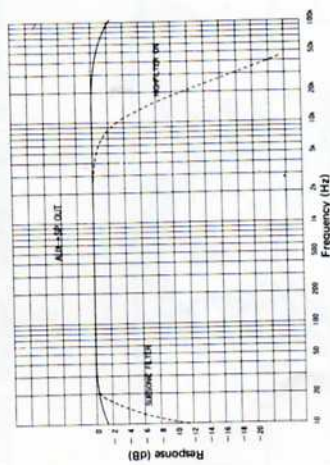
### Response Characteristics for the Filters



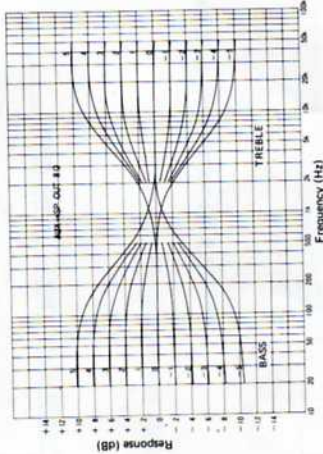
# CA-810

## PERFORMANCE GRAPHS

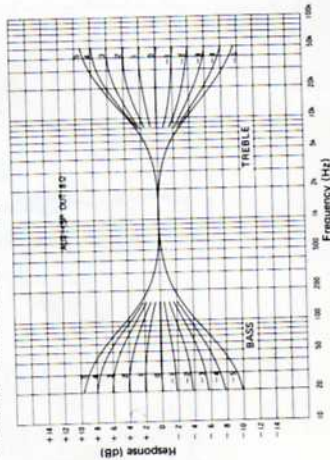
Frequency and Filter Characteristics



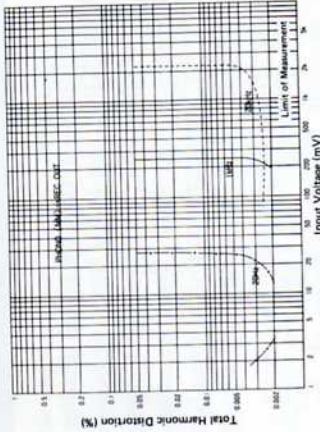
Tone Control Characteristics  $f_{70}$  500 Hz and 2.5 kHz



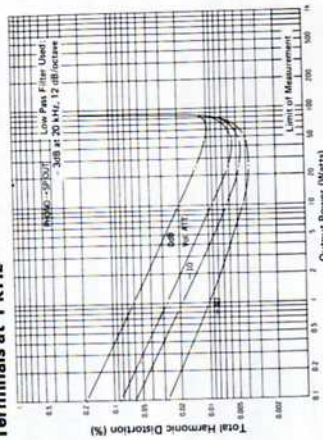
Tone Control Characteristics  $f_{70}$  125 Hz and 8 kHz



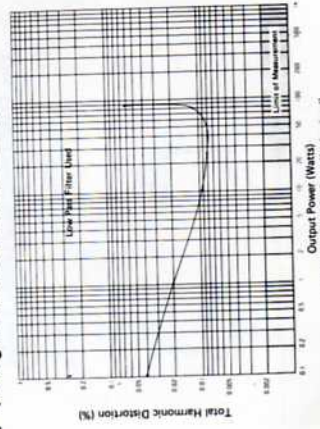
Total Harmonic Distortion from PHONO to REC OUT Terminals



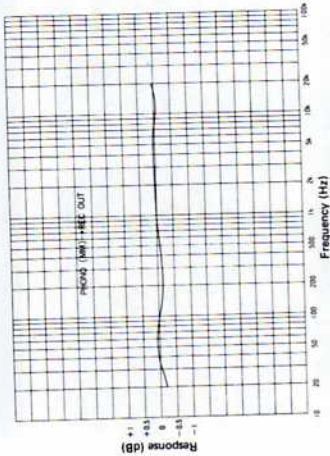
Output Power vs. Total Harmonic Distortion for PHONO to SP OUT Terminals at 1 kHz



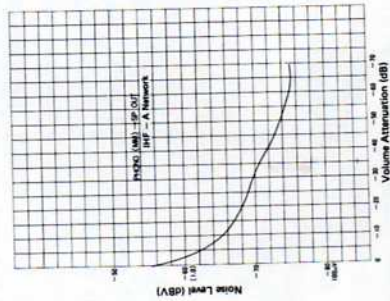
Total Harmonic Distortion for Output Power for PHONO to SP OUT (Using Vol. Attenuation Setting)



RIAA Deviation



Noise Level vs. Volume Attenuation



\* Vol ATT (Vol 0 db at clipping level)



# GA-810

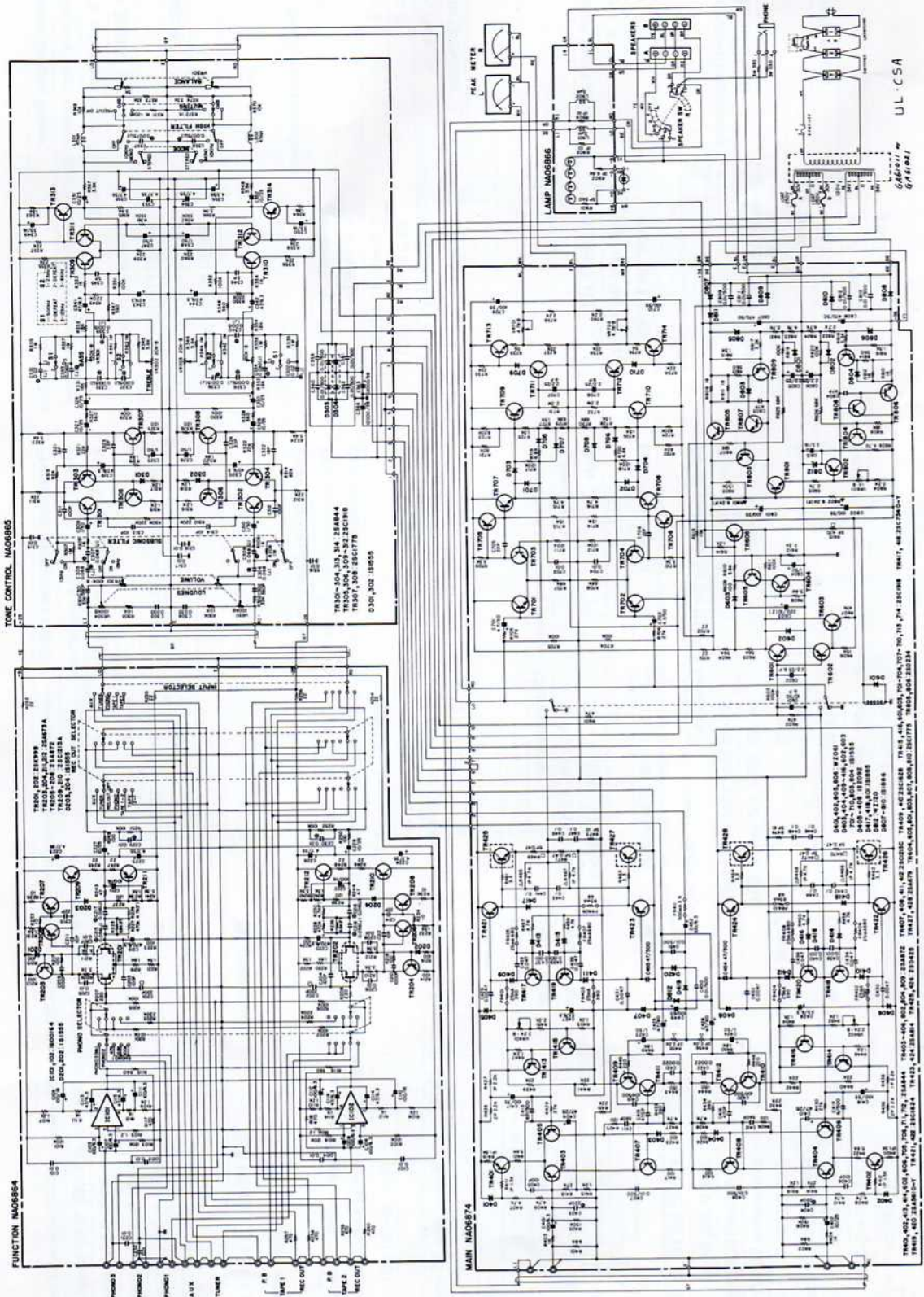
## SPECIFICATIONS

Minimum Output Power		Frequency Response		Distortion 20 Hz to 20 kHz	
Continuous rms power (both channels driven at rated 0.05 % total harmonic distortion)		Phono 1, 2, 3 RIAA deviation $\pm 0.3$ dB		Phono 1, 2 (MM) to Rec Out 0.005 % 10 V output	
20 to 20,000 Hz		Main In to Sp Out terminals $\pm 1.5$ dB		Phono 3 (MC) to Rec Out 0.05 % 3 V output	
65+65 Watts into 8 $\Omega$		Tuner to Sp Out terminals 10 Hz to 100 kHz +0, -1.5 dB		Tuner to Pre Out 0.01 % 3 V output	
80+80 Watts into 4 $\Omega$		Tuner to Sp Out terminals 10 Hz to 100 kHz +0, -2.5 dB		Main In to Sp Out 0.01 % into 8 $\Omega$ at 32.5 W	
70+70 Watts into 8 $\Omega$				Tuner to Sp Out 0.02 % into 8 $\Omega$ at 32.5 W	
90+90 Watts into 4 $\Omega$					
		IM Distortion		(60 Hz : 7 kHz = 4 : 1 250mW Rated power) with in 0.03%	
Input Sensitivity/Impedance		Tone Control Characteristics			
Phono 1		Bass turnover frequencies 125 Hz and 500 Hz		Noise-Distortion Clearance Range (NDCR) for 0.1 % into 8 $\Omega$	
2.5 mV/47, 68 or 100 k $\Omega$ (MM)		Bass boost/cut $\pm 10$ dB at 20 Hz (for 500 Hz)		Phono 1, 2 to Sp Out 0.1 W to 65 W (Vol. at -20 dB)	
Phono 2		Treble turnover frequencies 2.5 kHz and 8 kHz			
60 $\mu$ V/10 $\Omega$ (MC)		Treble boost/cut $\pm 10$ dB at 20 kHz (for 2.5 kHz)		Damping Factor at 1 kHz Better than 30 into 8 $\Omega$	
Phono 3					
Tuner, Aux		150 mV/50 k $\Omega$			
Main In terminals		1 V/50 k $\Omega$			
				Meters	
				Rise time 100 $\mu$ s	
				Decay time 0.75 sec	
Filters and Loudness Control Characteristics					
Subsonic		$f_c = 15$ Hz, 12 dB/octave		Meter range -50 dB to +5 dB	
High		$f_c = 10$ kHz, 12 dB/oct-ave		(0.5 mW to 158 W into 8 $\Omega$ )	
Maximum Input Levels		Loudness control		General	
Phono 1, 2		Level-related equalizer		Power supplies	
0.05% T.H.D				120 V, 60 Hz (U.S.A. and Canada)	
230 mV (at 1 kHz)				240 V AC, 50 Hz (Australia)	
Phono 3				110/120/130/220/230/240 V AC,	
6 mV (at 1 kHz)				Switchable 50/60 Hz (Other Areas)	
Output Level/Impedance		Signal-to-Noise Ratio (IHF-A Network)		Power consumption	
Rec Out terminals		Phono 1, 2 (MM) 95 dB (for 10mV shorted)		350 W/450 VA (U.S.A. and Canada)	
150 mV/600 $\Omega$ (rated)		Phono 3 (MC) 84 dB (250 $\mu$ V input, 50 $\Omega$ short)		550W (Other Areas)	
14 V (maximum, at 1 kHz)		Tuner, Aux 100 dB		Dimensions (W x H x D) 435 x 160 x 337 mm	
1 V/2 k $\Omega$ (rated)		Main 115 dB		17-1/8" x 6-5/16" x 13- 1/4"	
3 V (maximum, at 1 kHz)		Residual noise Less than 0.2 mV (at Vol. MIN)		Weight 12 kg (26 lb 7 oz)	

Specifications subject to change without notice.

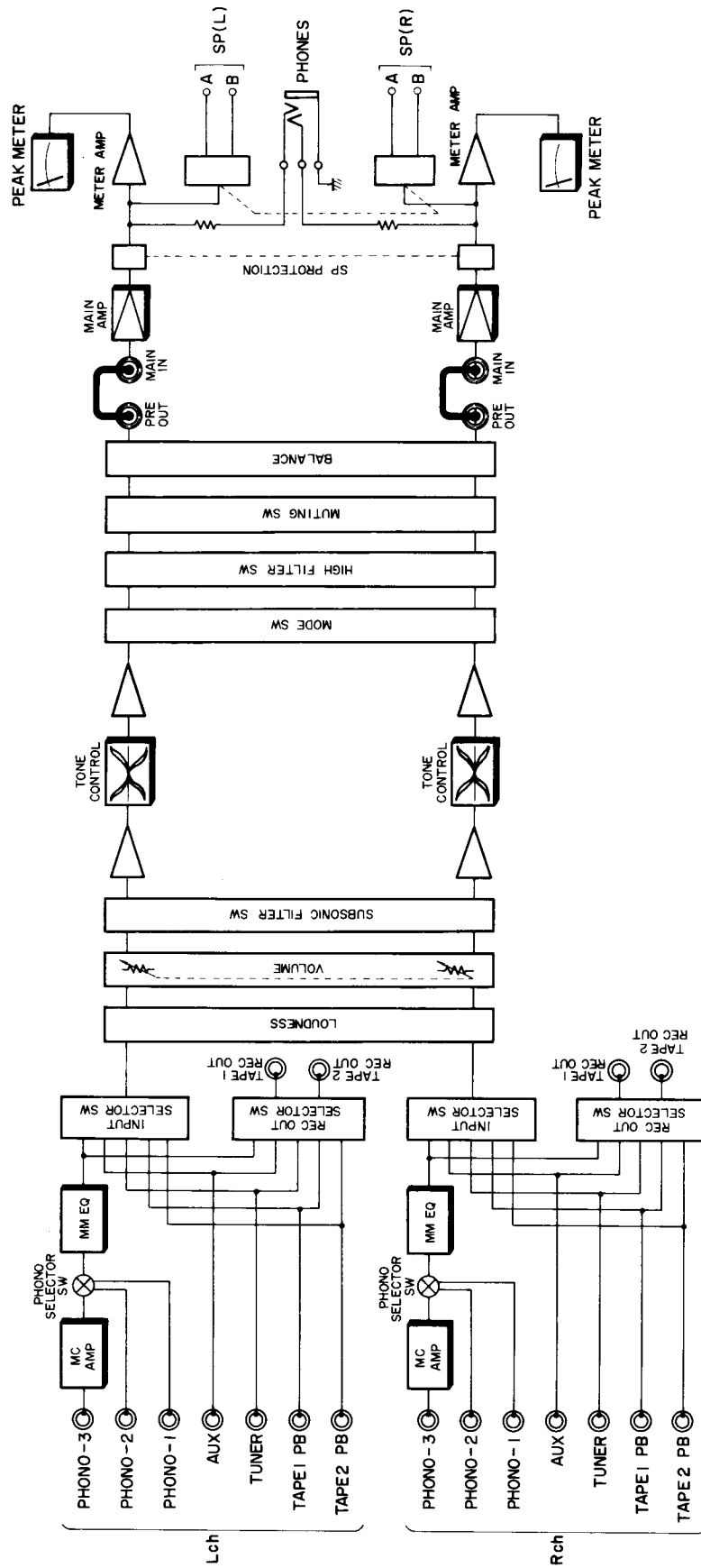
# CA-810

## CIRCUIT DIAGRAM



# GA-810

## BLOCK DIAGRAM



# CA-810

## TROUBLE SHOOTING

Before assuming that your CA-810 is faulty, check the following trouble-shooting list, which details many steps 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. Contact your service representative for a replacement.
No sound although power is connected.	Volume too low. INPUT SELECTOR in wrong position. Input pin plugs incorrectly inserted, loose, or disconnected. Speaker connections faulty. SPEAKERS switch OFF. The AUDIO MUTING switch is at PRE OUT OFF.	Turn up volume. Check and change as necessary. Check and insert fully in the correct positions. Check and make good. Set to correct position. Switch back to 0 dB or -20 dB.
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 gone into operation.	Check for incorrect (too low) speaker impedances or short circuits and correct. If the fault persists, switch off and wait briefly before switching on again. Contact your service representative for a replacement.
Poor bass response and badly defined stereo image.	AC main fuse has blown.	Reverse the connections to one speaker, not both.
A loud 'humming' is heard with, or instead of, the record when attempting PHONO audition.	Speaker + and - connections are incorrect. 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 defective shielding if necessary. Check and make good the GND (ground) wire connection.
The volume control 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, and is called 'howling.'	Increase the separation between turntable unit and speakers, avoiding locations directly in line with the speakers.
Your tape recorder does not record the program you are monitoring.	The REC OUT selector is not set to the required program source.	Turn to the required setting.

Note: The hexagonal wrench accessory may be used to re-position or remove any selector switch knob.