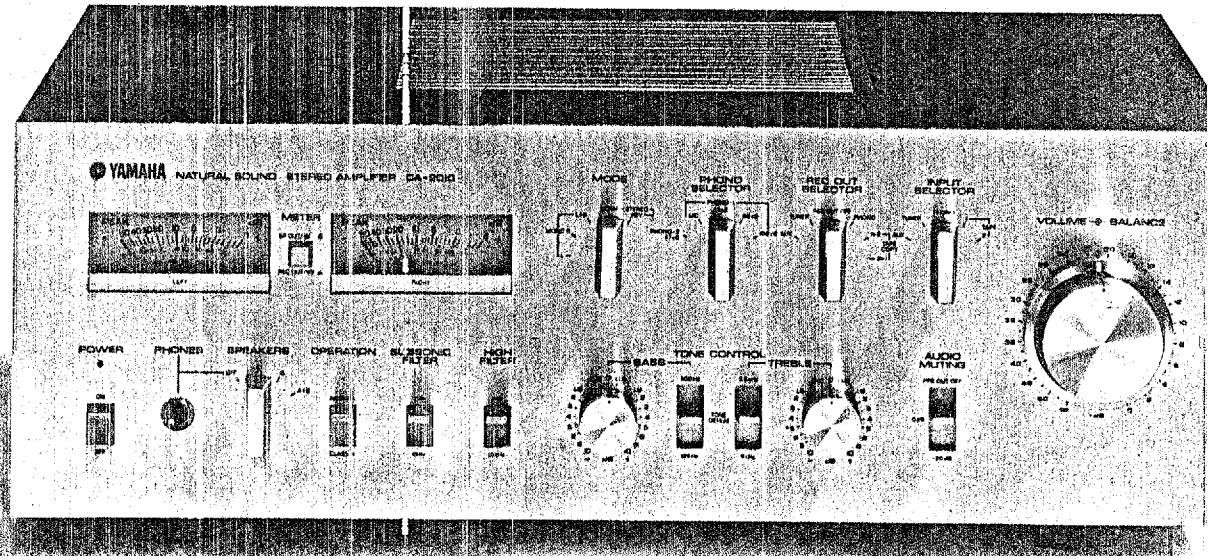
YAMAHA
CA-2010

Integrated Stereo Amplifier

Owner's Manual



IMPORTANT !

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

Model Name **CA-2010**

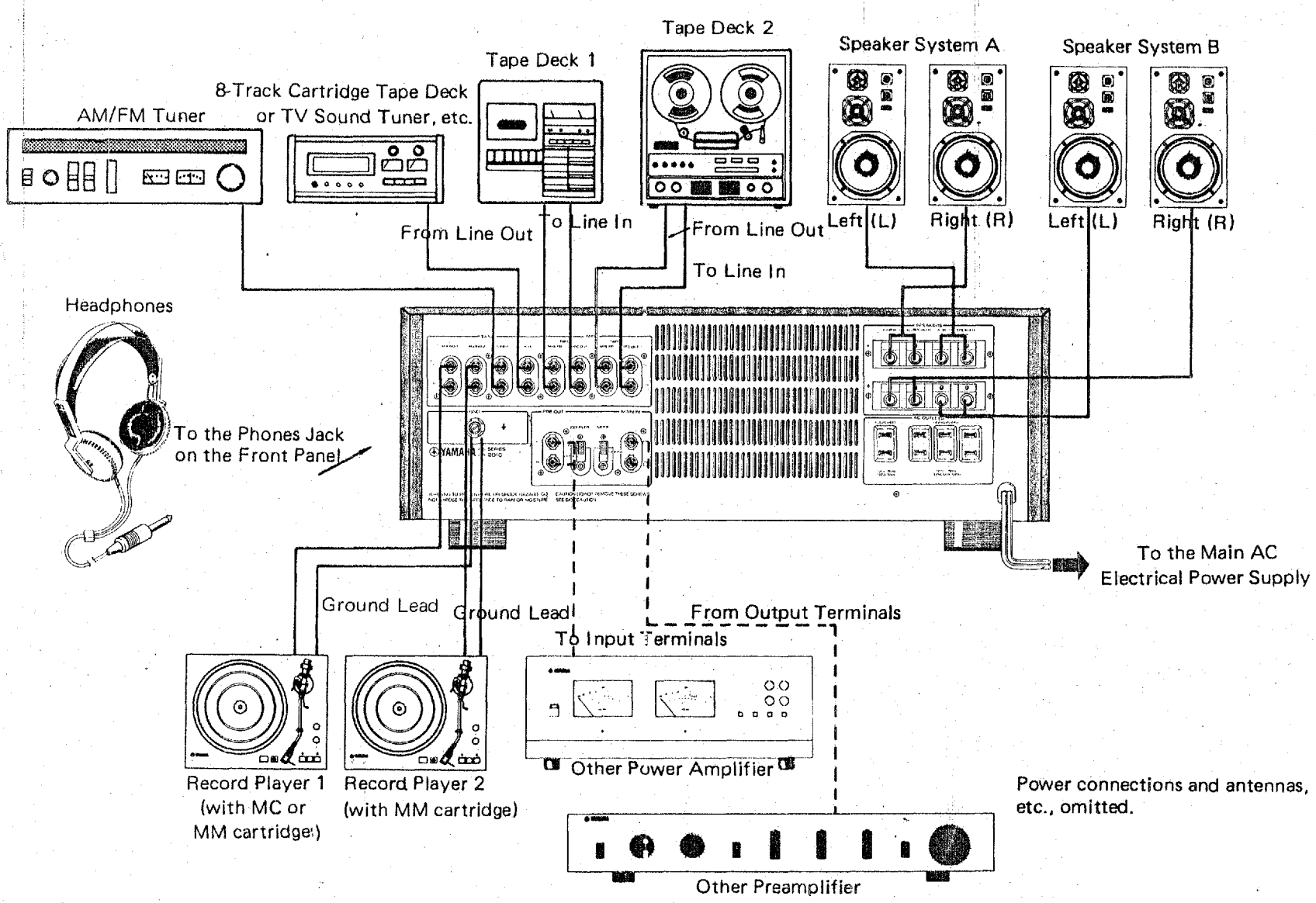
Serial No. _____

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

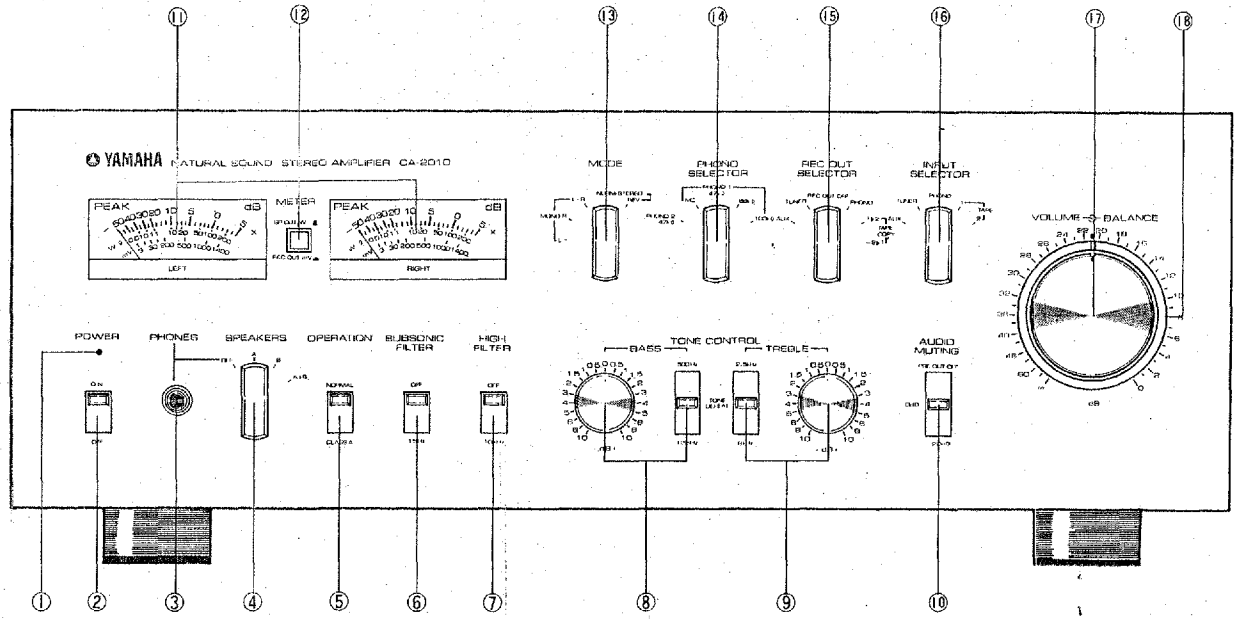
Retain this Owner's Manual in a safe place for future reference.

CA-2010

CONNECTION DIAGRAM

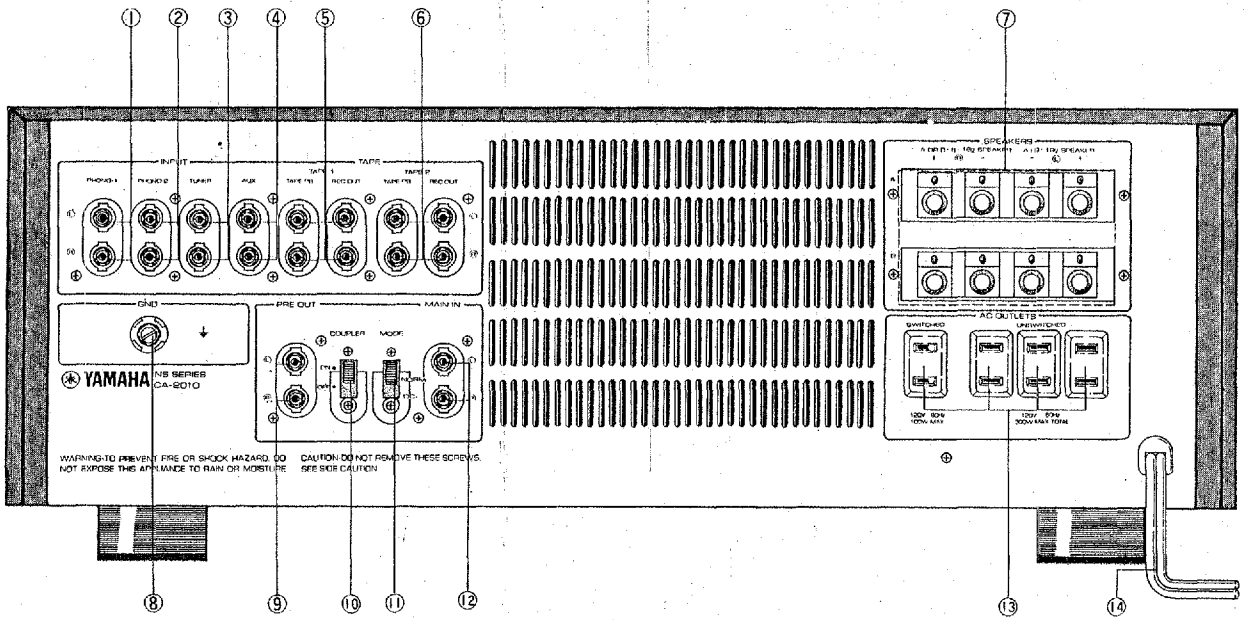


FRONT AND REAR PANELS

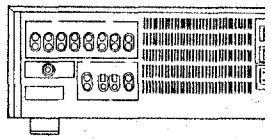


The front panel numbers are explained on pages 6 – 7.

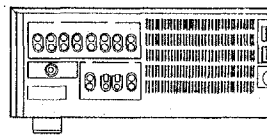
The rear panel numbers are explained on pages 8 – 9.



General Model



European & British Models



Australian Model

CA-2010

CONTENTS AND FEATURES

YAMAHA offers you thanks and congratulations on your choice of the CA-2010 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.

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

Special Instructions for Britsh-Standard Model

IMPORTANT

THE WIRES IN THE MAINS LEAD ARE COLOU
IN ACCORDANCE WITH THE FOLLOWING CODI

BLUE: NEUTRAL
BROWN: LIVE

As the colours of the wires in the mains lead o apparatus may not correspond with the coloured m Identifying the terminals in your plug proceed as fo The wire which is coloured BLUE must be connec the terminal which is maked with the letter N or col BLACK. The wire which is coloured BROWN m connected to the terminal which is maked with the L or coloured RED.

SPECIAL FEATURES OF THE CA-2010 AMPLIFIER

1. DC Power Amplification with Switched Class A and Class B Operation

The power amplifier section makes true DC performance (to zero Hz) available, featuring ultra low distortion first stage Yamaha dual-FET differential amplification, parallel push-pull circuitry and SEPP output, with choice of Class A and Class B operation at equivalent volume levels.

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 96 dB and phono dynamic range up to 310 mV and RIAA deviation within ±0.2 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. Switching between MC and MM cartridges is on the front panel.

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) and of the Rec Out output (in mV).

6. Extremely Stable Power Supply Section

Two, 22,000 μF electrolytic capacitors and massive mains transformer give stable power supplies.

7. A Host of Other Important Features

These include relay-operated speaker protection, improved S/N due to four-gang volume control, a full range of accessory circuits, and the functional beauty of Yamaha design.

CA-2010

CAUTIONS-READ THIS BEFORE OPERATING YOUR CA-2010

1

The CA-2010 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-2010, which is a precision electronic instrument, nor place it where it will be exposed to direct sunlight, excessive heat (for instance over a radiator), cold, moisture, or dust.

3

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

4

Do not assume your CA-2010 is faulty before checking the Trouble Shooting list on page 21 for common operating errors, and do not attempt to carry out internal adjust ments or repairs. Leave these to your local service representative.

5

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.

6

Note that the muting circuit keeps the CA-2010 silent for several seconds after switching ON, to prevent the pops and clicks that can occur.

7

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-2010 provides if the original level was too high.

8

If your CA-2010 is provided with a voltage selector, this must be set to your local AC mains voltage. Failure to do so will result in seriously impaired performance or even severe damage to your CA-2010. If your precise voltage is not covered, use the next setting immediately above your AC mains voltage.

9

If your CA-2010 is provided with spare AC outlets, do not connect items of audio equipment which will draw more than the rated power.

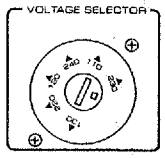
10

Keep this manual in a safe place for future reference, and refer to it frequently until you are perfectly familiar with all CA-2010 controls and functions.

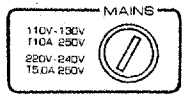
11

If your CA-2010 is fitted with user-accessible fuse holder, check the fuse rating before turning on the power to avoid blowing out the fuse.

VOLTAGE SELECTOR



MAINS FUSE



On American and Canadian models there is neither a mains fuse nor a voltage selector on the rear panel. The fuse is located inside the unit.

CA-2010

FRONT PANEL AND CONTROLS

❶ POWER ON Indicator

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

❷ 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.

❸ 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.

❹ 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.

❺ OPERATION

This control allows you to switch from normal Class B amplification to Class A amplification, which provides lower distortion by eliminating notch and switching distortion, but has a maximum power output capability of 30 watts.

❻ 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 25 Hz, it can be left in the ON position permanently with virtually no adverse effects on the normal sound output quality.

❼ HIGH FILTER

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

❽ TONE CONTROL-BASS

This BASS tone control gives delicately graduated control of the low frequency region. The dB calibrations show the degree of boost or cut at 20 Hz. The three-way switch offers a choice of 125 Hz or 500 Hz turnover frequencies with a DEFEAT position comparison of the effect with, and the tone control setting.

❾ TONE CONTROL-TREBLE

This TREBLE tone control functio high frequencies as the BASS ton does for the low frequencies. It a three-position switch permitting and turnover frequency selection case, the turnover frequencies are 2.5 kHz and 8 kHz.

❿ AUDIO MUTING Switch

When this three-position switch middle, 0 dB position, the amplif tions normally. When the switch is the −20 dB position, a straight reduction in listening volume is without any need to vary the V control setting. This is used whe erating switches and when lowe phono cartridge onto the record. Se switch to the PRE OUT OFF completely isolates the main ampli all inputs, thus allowing you to r break various connections to th amplifier without risking damage speakers by very large transient out

⓫ PEAK Meters

These meters provide two different types of readout. The first is the power output for the individual channels, which is read directly in Watts (for 8 ohm speakers), or in dB on the −50 dB to +5 dB scale. The other readout is taken from the scale calibrated in millivolts in order to measure the output voltage provided for external tape-recording decks. This readout is not possible when the REC OUT SELECTOR is in the OFF position.

⓬ METER Switch

This switch allows you to choose between the SP OUT measurement in Watts, and the REC OUT measurement in mV.

⓭ MODE Switch

In addition to normal stereophonic audition, you can use this switch to listen to either the left-hand or the right-hand channel alone (L or R positions) or to both together in the monaural mode. Also, you can use this switch to reverse the stereo outputs.

⓮ PHONO SELECTOR

In the PHONO 1 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 positions for the normal Moving Magnet (MM) cartridges: the standard 47 kΩ and also 68 kΩ and 100 kΩ. The PHONO 2 position allows the use of a standard 47 kΩ MM cartridge.

Special precautions taken with the head amplifier IC circuitry make it possible for the low level 50 μV input to the MC phono input terminals to be switched, which is normally very difficult to accomplish without hum and switching noise. Therefore, it is possible to substitute an MC cartridge for an MM cartridge in a record player and to still use the same jack connections on the back panel of this amplifier, by using the PHONO SELECTOR on the front panel.

⓯ REC OUT SELECTOR

This switch selects which of the programs connected to the CA-2010 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-2010 is completely disconnected electrically from the tape recording terminals.

⓰ 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.

⓱ VOLUME Control

This high precision control can be used to give the degree of attenuation indicated by the dB calibrations, and so to obtain the volume of sound required. Always start with the knob turned fully counter-clockwise (at the ∞ position) before turning up to normal listening levels. For a temporary reduction in level, use the AUDIO MUTING switch, but do not use the VOLUME control to restore the level to normal: the further increase in level on returning to the 0 dB setting might be enough to damage your speakers.

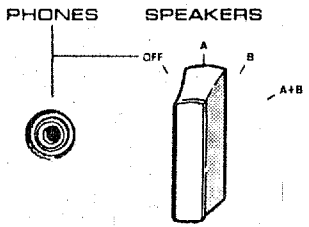
⓲ BALANCE Control

This ring control around the VOLUME control is used to adjust the balance between right- and left-hand speakers. A click stop identifies the center position, corresponding to the '21 dB' calibration on the VOLUME control. Leave it in this position unless you need to compensate for an imbalance between stereo channels.

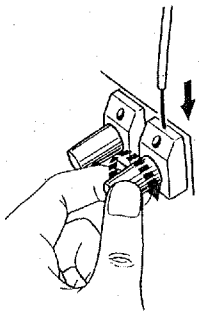
CA-2010

REAR PANEL AND CONNECTIONS

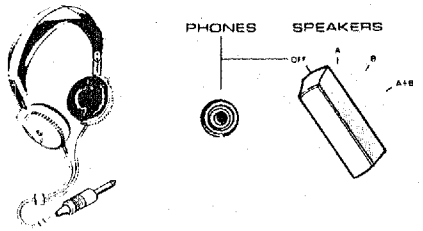
The Speaker Switch



Making Speaker Connections



Headphone Connection



❶,❷ PHONO INPUT Terminals

Connect the plugs from your turntable unit to these terminals. Note that for all the terminals, the upper jacks are for the left-hand channel and the lower jacks are for the right-hand channel. Use the PHONO 1 terminals first, particularly if you may use MC cartridges, keeping the PHONO 2 terminals as spares (only MM cartridges are suitable). Make certain to turn the PHONO SELECTOR switch on the front panel to the corresponding position.

❸ 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.

❹ AUX Terminals

Use these terminals for connecting a second tuner, or another piece of audio equipment. For example, it can be used with a micro-

phone mixing amplifier for live ster cording if you have a tape deck. certain that the INPUT SELECTOR is AUX position for this function.

❺,❻ TAPE PB and REC OUT Terminals

Two tape decks can be connected tc input and output terminals. Recordin be made on both tape decks at the time, and tapes can be dubbed fror tape deck to the other, in either dire according to the REC OUT SELE switch, and independent of the source auditioned.

❼ SPEAKERS Terminals

Two sets of speaker terminals are pr on the rear panel, for A and B s systems. Either, both, or neither selected via the front panel SPEA switch Only use speakers with impedances of 8 ohms or more if yo to either A or B system.
Likewise, use speakers with each impe 16 ohms or more if you listen both A system. Use the OFF position listening with headphones.

(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 CA-2010 to the + terminal on the speaker, and the − terminal on the CA-2010 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) 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.

⑧ 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.

⑨,⑩,⑪,⑫ PRE OUT and MAIN IN Terminals and Switch

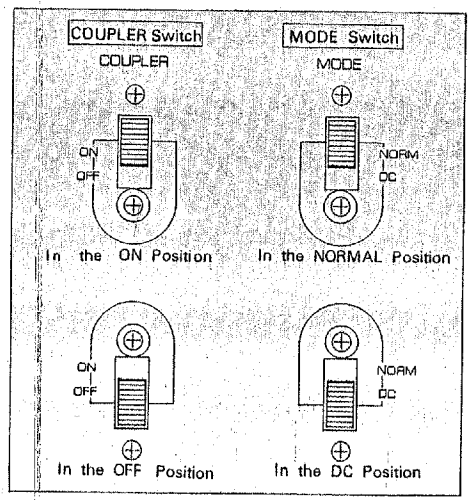
Leave the COUPLER switch ON for normal operation of the CA-2010 (the plastic guard is to prevent you from mistakenly putting it OFF). In the OFF position the preamplifier section output is disconnected from the power amplifier section, and an external signal, from another preamplifier or from a frequency divider, etc., may be applied to the MAIN IN terminals. Note that the output from the preamplifier section is always available from the PRE OUT terminals.

The MODE switch determines whether the full DC response (to zero Hz) of the power amplifier section will be available at the MAIN IN terminals when the COUPLER switch is OFF, or whether a blocking capacitor will be connected to isolate the amplifier from subsonic frequencies. The latter is the NORMAL position, guarding against DC or near-DC signals being amplified and reaching the output terminals, where the protective circuits would operate and interrupt audition.

⑬ AC OUTLETS

The left-hand outlet is controlled by the CA-2010 POWER switch on the front panel. It has a maximum rated capacity of 100 W. The remaining outlets, with a combined capacity of 300 W, are unswitched. Do NOT exceed these maximum ratings. Note that spare AC outlets cannot be provided in certain areas.

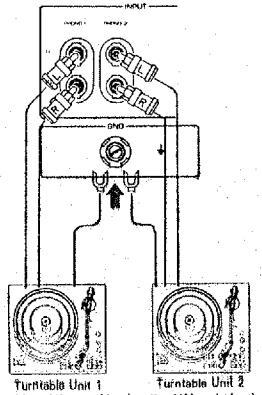
⑭ AC Mains Cord



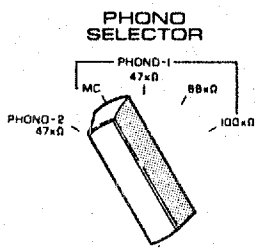
CA-2010

LISTENING TO RECORDS

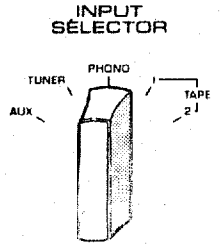
Record Player Connection



PHONO SELECTOR Switch (in the MC position)



INPUT SELECTOR Switch



CONNECTING A TURNTABLE UNIT

The main AC supply plug of your turntable unit may conveniently be inserted into any AC mains outlet socket, or into one of the spare sockets on the rear panel of the CA-2010 if these have been provided. The output lead from the turntable unit should be connected to the PHONO 1 terminals, especially if you intend to use moving coil cartridges, keeping the PHONO 2 terminals as spares. Check that the L and R pin plugs have been connected inserted. Be not forget to connect the turntable ground line to the GND terminal on the CA-2010.

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 88 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.

Note that the PHONO 2 terminals can on
used with MM cartridges suitable for 4
impedance.

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

Use the −20dB position of the AU
MUTING switch to cut the volume instantly b
dB while changing records or altering the PH
switch, without having to turn down the vo
each time.

Be not use the MC phono setting with
cartridges: you will overload the head amp
and produce quite unacceptable levels of d
tion.

If you play monaural records, the sign
noise ratio will be improved if you turn the M
selector switch to the monaural (L + R) pos

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

TUNER AND AUX

TUNER CONNECTIONS

Connect the tuner output terminals to the CA-2010 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-2010 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-2010, 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

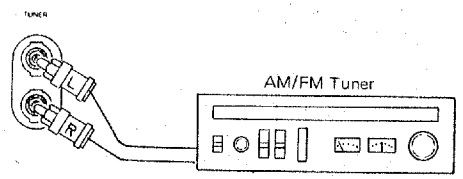
This is a spare input for any sound source you wish to connect to the CA-2010. When connecting a stereo source to these terminals, insure the left-hand and the right-hand plugs are inserted in the proper jacks.

This input has a sensitivity of 120 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).

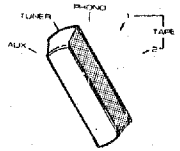
It can also be used with a microphone mixing amplifier for live stereo recordings if you have suitable equipment. In using these auxiliary units, make sure that they are compatible with the input impedance of 50 kΩ for these terminals.

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 appropriately to MONO L, MONO R, or MONO L + R.

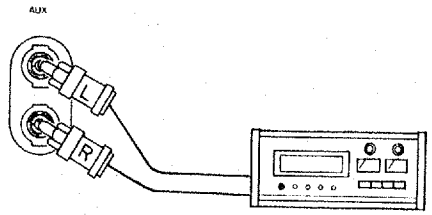
Tuner Connections



INPUT SELECTOR

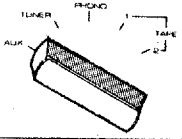


Connections to the AUX Terminals



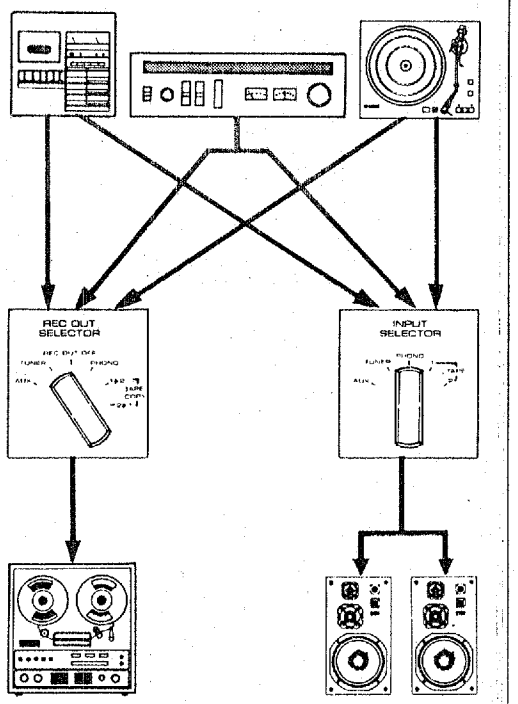
8-Track Cartridge Player, TV Sound Tuner, etc.

INPUT SELECTOR



REC OUT SELECTOR, TAPE PLAYBACK AND RECORDING

Recording One Program Source While Listening to Another



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-2010 is completely disconnected from the recording output terminals. Thus, when you are not recording, the CA-2010 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-2010 TAPE PB terminals. Use the TA terminals for your main deck. Use the TA terminals for a second deck or as a spare pai the INPUT SELECTOR to TAPE 1 to play tapes (or to TAPE 2 if you are using the TA terminals, of course). Use the output level cor on the deck or decks to adjust the playback so that there is no great change in volume when switching between TUNER and TAPE 1 inputs.

TAPE DECK CONNECTION/RECORDIN

The tape-deck leads provided are use connect the deck LINE input terminals tc REC OUT terminals. Again, you should us TAPE 1 terminals for your main deck, keepin TAPE 2 terminals for a second or spare pair. that the INPUT SELECTOR switch setting h *effect whatever* upon the signal which wi recorded via these terminals. The REC terminals' signal is decided by the REC selector switch. If you refer to the descriptic the REC OUT function you will see that reco of any of the program sources connected tc CA-2010 is possible: just set the REC OUT sv to TUNER, PHONO, or AUX, respectively.

Recording of any of these sources can prc while that source, or any other, is selectec audition by the INPUT SELECTOR switch. M toring of the recording while it is in progres be carried out, if you are using a three-head

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.)

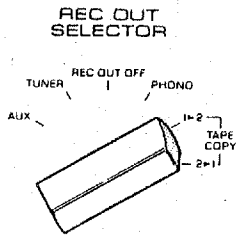
The level at which a recording is made is very important (see the instruction manual provided with your tape recorder). Adjustments in level should normally be made with the input level controls on the tape deck.

Tone, level, and other controls have no effect on the signals being recorded via REC OUT terminals. Tonal corrections must be made during playback. However, if you attach the LINE input terminals of the tape deck to the PRE OUT terminals on the rear panel, instead of the normal REC OUT terminals, you gain the convenience of being able to set levels, and alter the tonal balance of the recording, using filters, etc., but you are limited to the program source selected by the INPUT SELECTOR switch. You will also be unable to monitor recordings. This, and the fact that tone and filter controls inevitably introduce some extra distortion (although very little in the CA-2010!), means that you should normally record via the REC OUT terminals provided for TAPE 1 or TAPE 2, using the PRE OUT terminals only when it is necessary, for instance when level adjustment is essential to prevent distortion.

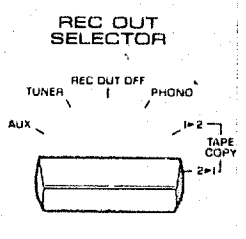
TAPE TO TAPE DUBBING

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.

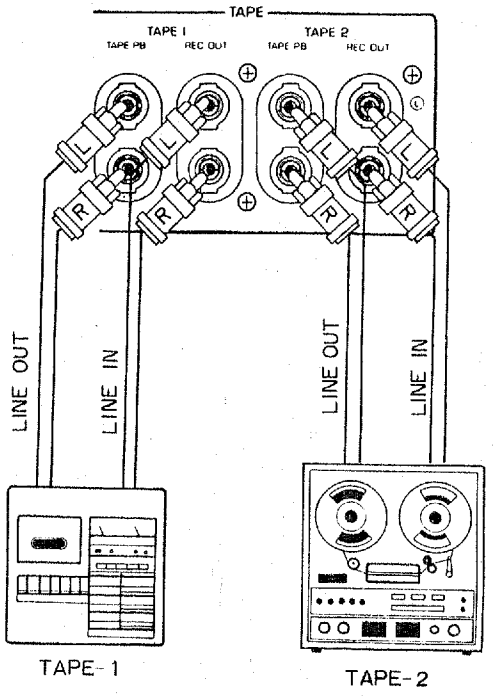
Tape Dubbing (1▶2)



Tape Dubbing (2▶1)



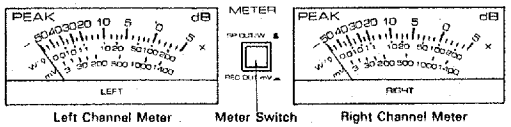
Tape Deck Connections



CA-2010

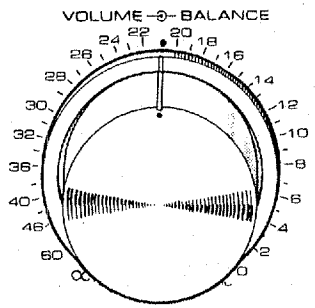
METERS AND LEVEL CONTROLS

The Peak Level Meters and the Meter Switch

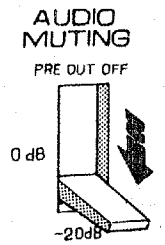


Left Channel Meter — Meter Switch — Right Channel Meter

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



AUDIO MUTING Switch



METERS

The peak meters used in the CA-2010 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 (unswitched) scale, with 0 dB corresponding to 100 Watts output into 8-ohm speakers. The calibration in Watts runs from 0.001 (1 mW) to 316 Watts. Note that these readings should be doubled for 4-ohm speakers, and halved for 16-ohm speakers.

When the METER switch is pushed from SP OUT/W into the REC OUT/mV position, the meters will instead read the output levels applied to the REC OUT terminals, with 0 dB corresponding to 1,000 mV. Likely, +5 dB corresponding to 1.8 V and −50 dB, 3.16 mV. The maximum reading is 1,400 mV, and readings go down to 3 mV. This feature is extremely useful in setting tape deck recording levels accurately.

Note that when the REC OUT SELECTOR switch is in the REC OUT OFF position, the meters will not give a reading when switched to REC OUT/mV.

VOLUME, BALANCE AND MUTING

Set the degree of attenuation required to gi the desired listening level by the VOLUME co trol. It is good practice to turn the VOLUM control fully counter-clockwise, to the ∞ positio whenever you switch on the CA-2010, before tur ing up the volume. The BALANCE CONTRO adjusts the balance between the left- and righ hand stereo channels. A monaural source shou appear mid-way between the two speakers whe the BALANCE is set at the click-stop settir (opposite the 21 dB position for the VOLUM control. Turning the BALANCE control clockwi will reduce the volume from the left-hand speak and vice versa.

The AUDIO MUTING control can be used t introduce a straight 20 dB reduction in signal lev (a drop to one-tenth the unswitched powe without having to use the VOLUME control. Th is used when switching between different prograi sources, and lowering the phono cartridge onto th record. There is also a PRE OUT OFF positio which isolates the main amplifier completely fro the output of the preamplifier. This is useful whe inserting or removing plugs into the rear pan with power applied to the CA-2010.

CA-2010

TONE AND FILTER CONTROLS

TONE CONTROLS

Both treble and bass tone controls on the CA-2010 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.

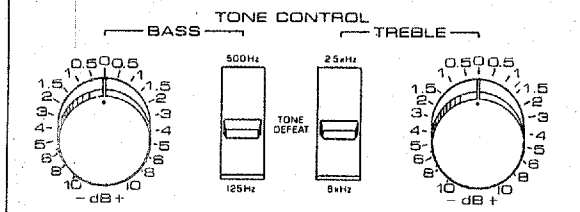
Turnover frequencies are either 125 or 500 Hz for the bass control and either 2.5 or 8 kHz for the treble. Start with the 125 Hz and 8 kHz positions. If adequate control cannot be obtained with these settings, try the 500 Hz and 2.5 kHz positions, which extend the effect of the tone controls well into 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.

FILTERS

The filter circuits of the CA-2010 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.

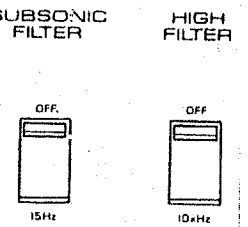
The HIGH FILTER operates at frequencies above 10 kHz, and is used to cut out unwanted tape hiss and record scratch. It should not be used unnecessarily.



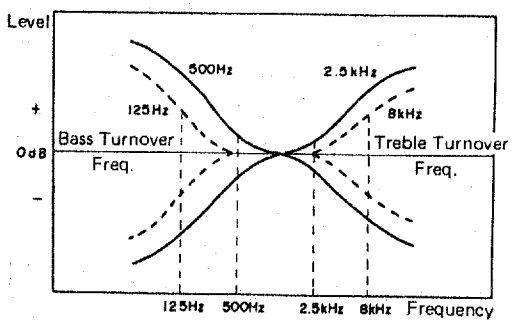
The Bass Control

The Treble Control

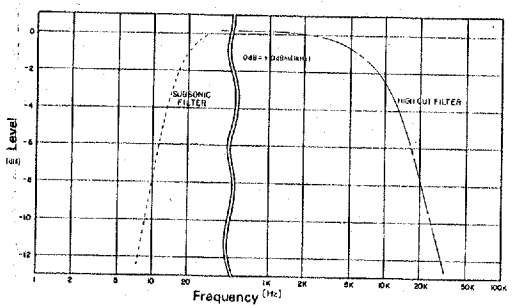
The SUBSONIC and HIGH Filters



Tone Response Characteristics



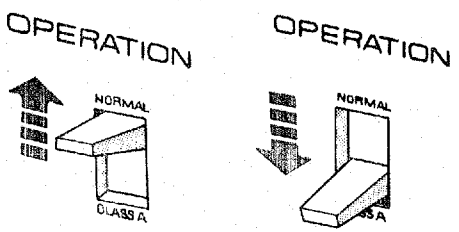
Response Characteristics for the Filters



CA-2010

OPERATION AND MODE CONTROLS

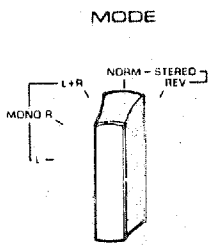
OPERATION Switch



Shown for Normal (Class B) Operation

Shown for Class A (Low Power/Distortion) Operation

MODE Switch



OPERATION CONTROL

The OPERATION switch selects whether the CA-2010 operates in Class A or in Class B. When large output powers are required, Class B should be used, particularly if rather inefficient bookshelf type speakers are being used. Class A is more suitable for listening at low volumes, or when using very efficient speakers, when the advantages of lower distortion and clearer tonal quality are more important than the loss of output power from 120 Watts to only 30 Watts per channel (for 8-ohm speakers).

Low output power is one disadvantage of Class A operation, but it is also much less efficient, taking much more electrical power, and getting much hotter in the process, than Class B. You should be particularly careful to avoid hot locations and poor ventilation when using Class A.

Note: DO NOT switch from Class B to Class A operation when the meters indicate outputs of over 30 Watts. The advantages of Class A are only retained to 30 Watts maximum.

MODE CONTROL

This switch offers control of the mode in w the signal applied to the input terminals is re duced. It cannot, of course, turn a monaural s into stereo, but it does offer considerable flex ty. The monaural positions are:

MONO L — For reproduction of the channel only.

R — For reproduction of the channel only.

L + R — For reproduction of monaural sum of both and right-hand channels.

The stereo positions are:

STEREO NORM — For normal reproductio stereo sources.

REV — For reproduction with and right-hand channels versed.

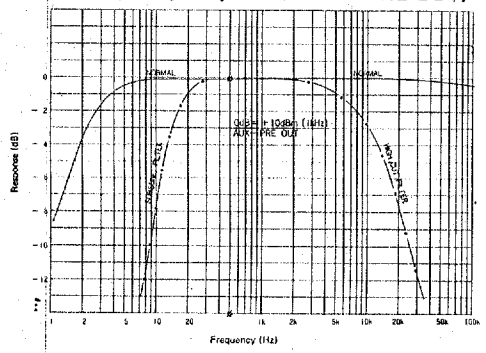
The MONO L + R position is best for reproduction of monaural records and radio grams from your tuner. The L and R posit may be used to check the individual channels stereo source.

The REV stereo position may be used porarily to correct reproduction where conne errors have resulted in reverse reproduction, the wiring is corrected.

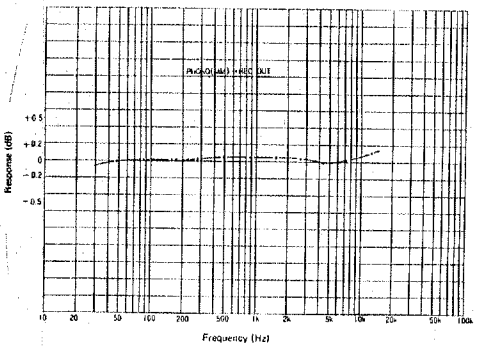
CA-2010

PERFORMANCE GRAPHS

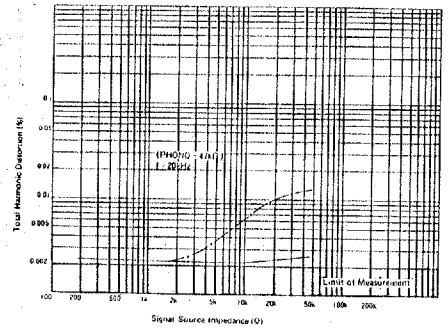
Filter Frequency Response (AUX to PRE OUT)



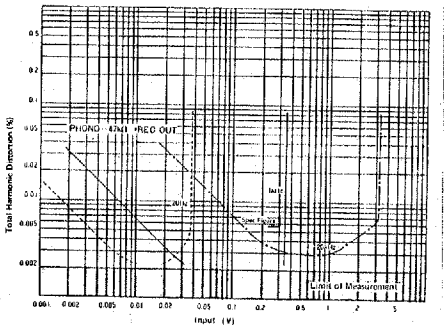
RIAA Deviation (PHONO MM to REC OUT)



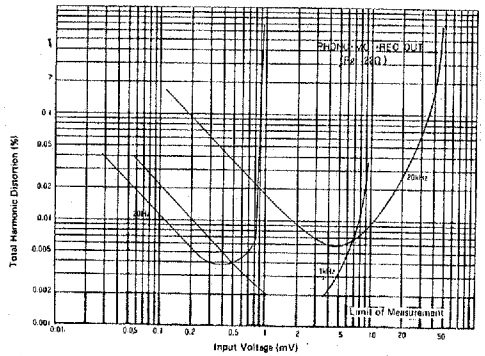
Improvement in Distortion with Cascode-Bootstrap Circuit



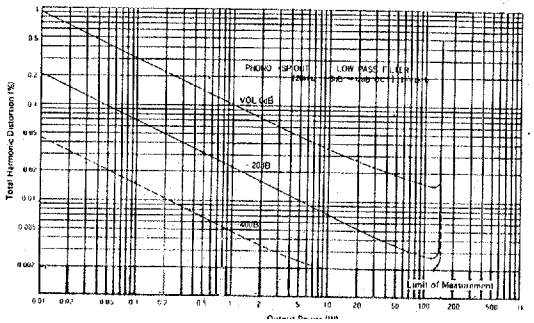
Input Level vs. Total Harmonic Distortion (PHONO 47kΩ to REC OUT)



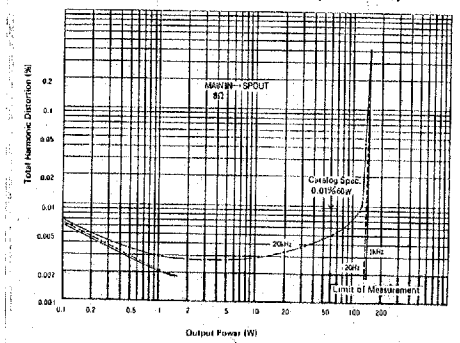
Total Harmonic Distortion vs. Input Level for the MC Head Amplifier (PHONO MC to REC OUT)



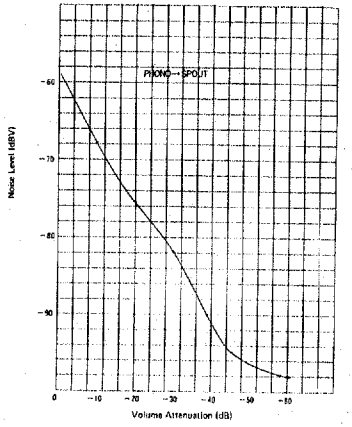
Total Harmonic Distortion from PHONO to SP OUT (1kHz into 8 Ω)



Output Power vs. Total Harmonic Distortion (Class B operation, both channels driven)



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



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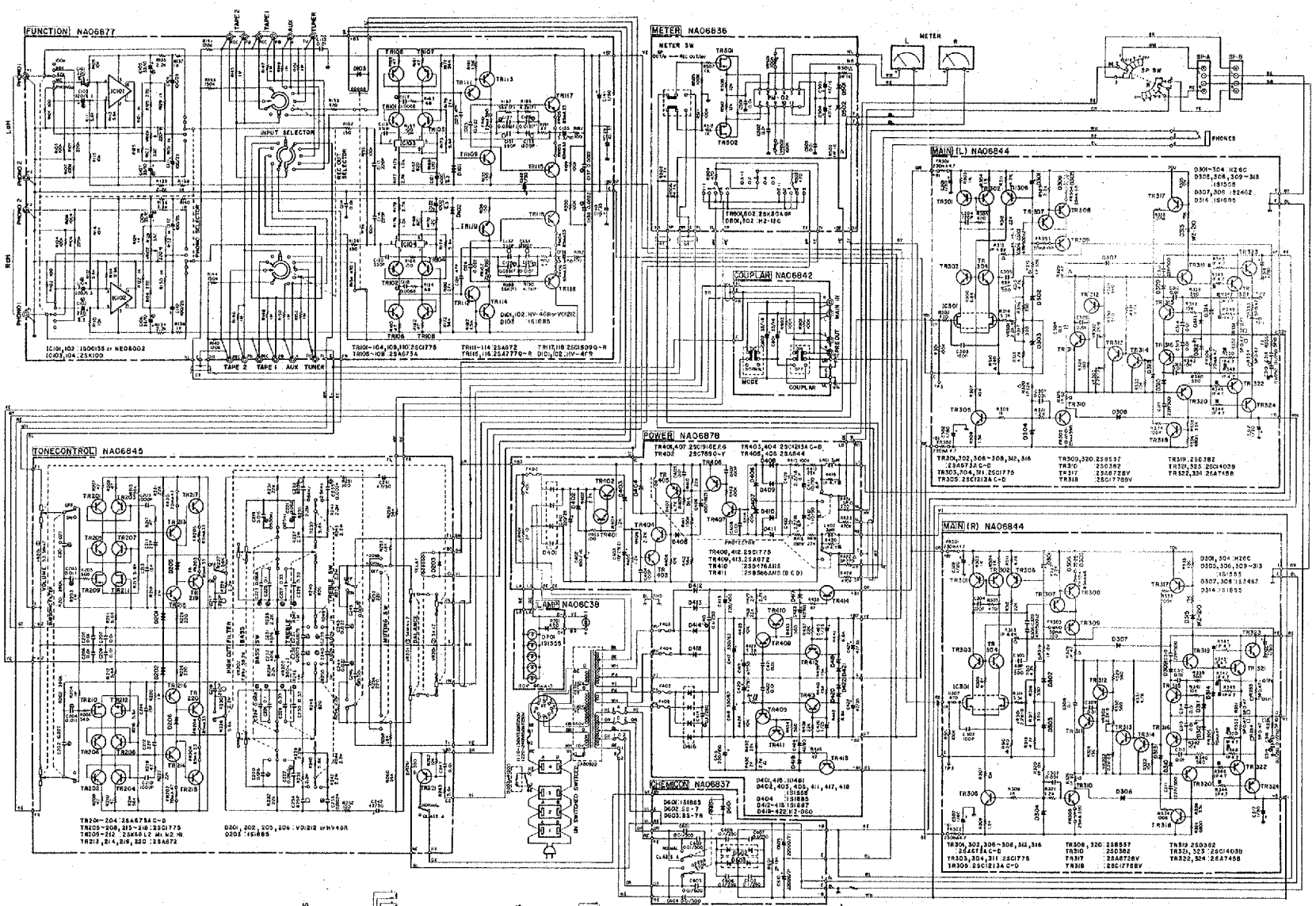
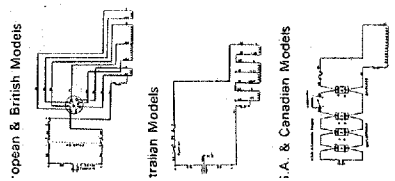
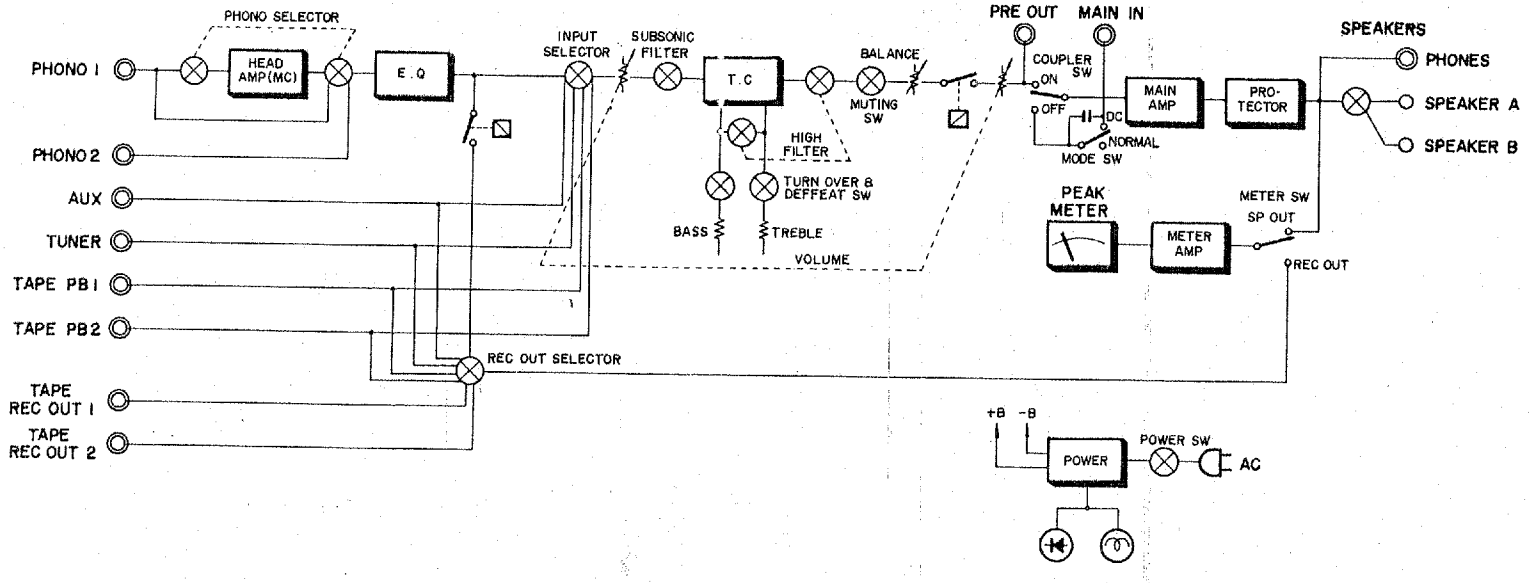
CIRCUIT DIAGRAM





CA-2010

BLOCK DIAGRAM



CA-2010

SPECIFICATIONS

Minimum output power	
Continuous RMS power (both channels driven at rated 0.03% total harmonic distortion)	
20 to 20,000 Hz	120+120 Watts into 8 ohms (Class B)
	30+30 Watts into 8 ohms (Class A)
at 1,000 Hz	125 + 125 Watts into 8 ohms (Class B)

Input sensitivity/impedance	
Phono 1	2 mV/47, 68 or 100kΩ (MM)
	50 μV/10 Ω (MC)
Phono 2	2 mV/47 kΩ
Tuner, Aux	120 mV/50 kΩ
Main in terminals	1 V/50 kΩ

Maximum input levels	
Phono 1 (MM), 2	310 mV (at 1 kHz, 0.02% distortion)
Phono 1 (MC)	7.5 mV (at 1 kHz, 0.02% distortion)
Tuner, Aux	20 V (at 1 kHz, 0.02% distortion)

Filters	
Subsonic	f_c = 15 Hz, -12 dB/octave
High	f_c = 10 kHz, -12 dB/octave

Signal-to-noise ratio (IHF-A network)	
Phono 1 (MM), 2	96 dB (for 10mV, shorted)
Phono 1 (MC)	85 dB (for 50Ω, shorted)
Tuner, Aux	100 dB
Main	118 dB
Residual noise	Less than 70 μV

Output level/impedance	
Rec Out terminals	120 mV/600 Ω (rated)
	18.6 V (maximum, at 1 kHz, 0.02% distortion)
Pre Out terminals	1 V/500 Ω (rated)
	7 V (maximum, at 1 kHz, 0.02% distortion)

Frequency response	
Phono 1, 2 RIAA deviation	±0.2 dB (MM/MC)
Tuner to Pre Out terminals	5 Hz to 100 kHz, +0, -1 dB
Tuner to SP Out terminals	5 Hz to 50 kHz, +0, -1 dB (8 Ω load)

Power bandwidth into 8Ω, 0.03% distortion	
Class A operation	10 Hz to 70 kHz (15W output)
Class B operation	10 Hz to 50 kHz (60W output)

Tone control characteristics	
Bass turnover frequencies	125 Hz and 500 Hz
Bass boost/cut	±10 dB at 20 Hz (for 500 Hz)
Treble turnover frequencies	2.5 kHz and 8 kHz
Treble boost/cut	±10 dB at 20 kHz (for 2.5 kHz)

Total Harmonic Distortion 20 Hz to 20 kHz	
Phono 1 (MM), 2 to Rec Out	Less than 0.003%, 5 V ou
Phono 1 (MC) to Rec Out	Less than 0.03%, 3 V out
Tuner, Aux to Pre Out	Less than 0.005%, 3 V ou
Main in to Sp Out (Class A)	Less than 0.005% into 8Ω
	15 W
(Class B)	Less than 0.01% into 8Ω
	60 W
Tuner to Sp Out (Class B)	Less than 0.01% into 8Ω
	60 W
IM Distortion	0.03%, 250mW to 120W (Aux to Sp Out)

Noise-Distortion Clearance Range (NDCR) for 0.1% THD in	
Phono to Sp Out	0.1 W to 120 W (Vol at -2
	4 mW to 120W (Vol at -4

Damping factor at 1 kHz	Better than 45 into 8 Ω

Meters	
Rise time	100 μsec
Decay time	0.95 sec
Meter range	-50 dB to +5 dB (1 mW t
	316 W into 8 Ω)

General	
Power supplies	AC 120 V, 60 Hz (U.S.A.
	Canada)
	AC 240 V, 50 Hz (Austral
	AC 110/120/130/220/23
	240 V switchable,
	50/60 Hz (Other Areas)
Power consumption (nominal)	450 W 550 VA (U.S.A. a
	Canada)
	900W (Other Areas)
Dimensions (W x H x D)	461 x 170 x 360 mm
	18-1/8" x 6-11/16" x 14-
Weight (U.S.A. and Canada)	20 kg (44 lbs.)
(Other Areas)	21 kg (46 lbs. 5oz)

CA-2010

TROUBLE SHOOTING

Before assuming that your CA-2010 is faulty, check the following trouble-shooting list, which details many steps you can take yourself without having to call a service representative. Note that the hexagonal service wrench accessory may be used to re-position or remove any selector switch knob.

Fault	Cause	Cure
No power although POWER switch is ON (POWER LED unlit)	AC power line not plugged into supply socket.	Plug firmly into the supply socket.
	AC main fuse has blown.	Contact your service representative for a replacement.
No sound although power is connected.	Volume too low.	Turn up volume.
	INPUT SELECTOR in wrong position.	Check and change as necessary.
	Input pin plugs incorrectly inserted, loose, or disconnected.	Check and insert fully in the correct positions.
	Speaker connections faulty.	Check and make good.
	SPEAKERS switch OFF.	Set to correct position.
	PRE OUT/MAIN IN COUPLER switch in OFF position.	Switch back to ON.
	The AUDIO MUTING switch is at PRE OUT OFF.	Switch back to 0 dB or -20 dB.
Sound comes only, or mainly, from either L or R speaker	Speaker connections faulty.	Check and make good.
	Input connections faulty.	Check and make good.
	BALANCE control not properly adjusted.	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.
	AC main fuse has blown.	Contact your service representative for a replacement.
		* Replace with the correctly rated fuse type.
Poor bass response and badly defined stereo image.	Speaker + and – connections are incorrect.	Reverse the connections to one speaker, not both.
A loud 'humming' is heard with, or 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 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: Contact your service representative if your CA-2010 does not have user-accessible fuses.

SINCE 1887 YAMAHA

NIPPON GAKKI CO., LTD. HAMAMATSU, JAPAN