



RENO™ 400

OPERATING GUIDE

Thanks for your purchase of the Reno™ 400. You can now begin to experience a totally new strata of performance from you electric/acoustic guitar. The Reno™ 400 is the first of its type for the industry and has been designed with one phase of the market in mind. Over the years we've seen a tremendous number of people playing electric/acoustic guitar, but there are always negative aspects of patching those instruments into a typical guitar amp for a good acoustic sound. The Reno™ 400 is "state-of-the-art" in every aspect of design and construction and we have included our famous DDT compression circuitry which senses the onset of clipping from the power amp and compresses the signal only to the extent necessary to prevent distortion. The active tone circuitry has been included for the extreme wide range of frequencies encountered with acoustic guitars which have pickups either built-in or added to those instruments.

The Reno™ 400 is a very clean amplifier and performs in such a way to minimize distortion from the input through to the output including the loudspeaker/ horn combination. This system features a single channel and features a new **pre EQ** patch which allows effects devices to be inserted **before** the equalization so that maximum tone coloration may be used to enhance whatever effects devices are chosen.

The power section of this unit features 210 watts RMS and it delivers this power into a 4 ohm load. The addition of our DDT compression circuitry enables the Reno™ 400 to be louder and cleaner than other amplifiers in its power range.

On the rear panel we have also included preamp out and power amp input jacks for the all important patch of effects devices post (after) the EQ, and also provides the ability to go directly into a studio console or sound reinforcement mixer with the preamp output.

Please read this manual carefully to understand all the functions of the Reno™ 400 and adapt the technology designed within to your particular needs. We certainly believe you will find this unit to be the most advanced state-of-the-art system for electric/acoustic guitar.



INPUTS

The Reno™ 400 has two inputs, one featuring high gain and the other **one-third** as much gain. The number 1 input jack is actually 10 dB more sensitive than most inputs found on guitar amplifiers. This input is designed for an instrument with a typical piezo (ceramic) transducer type pickup. Piezo type add-on pickups require this extra 10 dB of gain so the signal-to-noise remains acceptable throughout the audio chain. The number 2 input is standard as far as input sensitivity for guitar amplifiers go and should be used with those instruments having built-in preamps (batteries) as this signal is quite a bit stronger than the average piezo pickup. The gain of both the inputs are the same and is slightly lower than the number 2 jack when instruments are plugged into both jacks. Note: Piezo transducer type instruments should be plugged into the number 1 input and instruments containing preamplifiers built-in should be plugged into the number 2 input. Two instruments containing preamps can be plugged into both inputs simultaneously.

PRE GAIN/PULL BRIGHT CONTROL

The pre gain control is similar to the conventional volume control in that it is the first level setting device in the system. Operation of this control is conventional and even though the associated circuitry is quite different from the older totally passive units there should be no problem with the operation. This control should be adjusted to the desired of gain necessary for the instrument but it is also working in conjunction with the post gain control. Once the post gain control is adjusted properly, then the gain desired for each individual instrument that is patched into the Reno™ 400 should be set with the pre gain control.

The pre gain control also features an integral "pull switch" which adds a significant boost (6 dB) to the high frequencies when it is activated. This high frequency boost gives a nice "edge" to clean playing styles and has been tailored specifically for acoustic guitar. The boost is activated by pulling out on the pre gain control and defeated by simply pushing the knob inward.

POST GAIN CONTROL

The post gain control sets the overall level from the preamp which feeds the 210 watt power section of the Reno™ 400. The action of this control is very similar to that of a master volume control and can be used to control the dynamics of the preamp section by decreasing the sensitivity of the power amp. Normal settings of this control will normally be from 12 o'clock to full clockwise. Rotating the control clockwise increases the sensitivity of the power amp and the overall volume level of the system. Some studio applications, because of low noise requirements, may need a fairly low setting of the post gain control but please be careful to keep the post gain control adjusted to at least the **same number setting** of the pre gain control to a void preamp overload which may cause distortion. An average setting for the post gain control under normal conditions during concert situations will be from the number 5 to 7 positions and could be slightly lower for studio applications. Once this control is adjusted properly for the amount of sensitivity you desire for the overall system, the gain of the individual instrument may be accomplished with the pre gain control.

PRE EQ PATCH

The unique pre equalization patching jacks have been provided for use with external devices such as volume pedals, effects devices, etc. This feature allows external devices to be patched into the system **after** the input preamp but **before** the EQ (tone controls). The sensitivity of the pre EQ patch has been optimized for low level (instrument signal) type devices. NOTE: Line level (1 volt) devices should be patched at rear panel - preamp out and power amp input loop. Shielded cables should be used for all external patching of effects devices.

EQUALIZATION

LOW EQ CONTROL

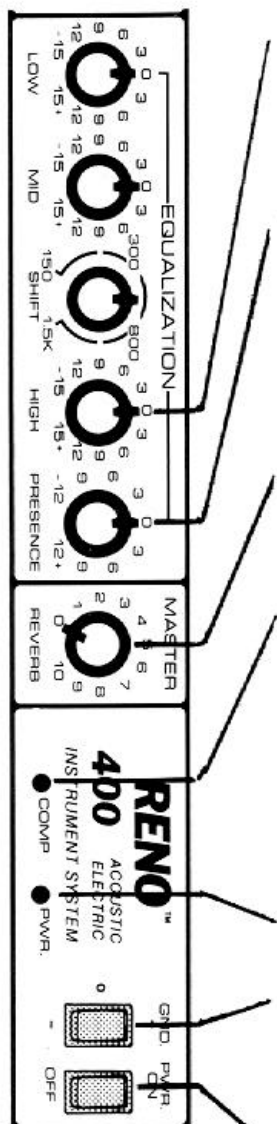
The low EQ control is of the active "shelving type" and provides low frequency boost in the clockwise positions and low frequency cut in the counterclockwise positions. Flat response is obtained in the vertical (12 o'clock) position as indicated by the zero in the center of the rotation. The action of this control is more or less conventional and no operational problems should be encountered. You should, however, avoid excessive low end boost since this greatly affects your amp's power reserve (headroom). Extreme low frequency boost also adds greatly to feedback problems encountered with acoustic instruments. The low EQ control is capable of more than 15 dB of boost or cut and you should be aware that each 3 dB doubles the amount of power necessary to produce the desired amount of low end. Even the 210 watt RMS capability of the Reno™ 400 may be overloaded by excessive low end boost at high volume levels and the tonality may become "confused" and more "muddy" than desired.

MID EQ CONTROL

This control enables a boost or cut of 15 dB in the vital mid-range frequencies. Added versatility is possible because of the ability to vary the operating centerpoint throughout the mid-range from 150 Hz to 1,500 Hz by use of the frequency shift control. The mid EQ control works in a similar manner to the low and high EQ controls and should present no operational difficulties. Clockwise settings increase "fat" mid-range frequencies and counterclockwise settings will result in a "thinner" sound with less mids apparent. Notice the zero position at 12 o'clock will indicate no change is taking place to the mid-range frequencies. A setting of zero will render the shift control ineffective because the mid-range is at that point totally "flat". Most acoustic guitar applications will require settings of the mid-range control from **minus 3 to minus 6** usually and these settings, of course, will vary from player to player because of technique and outboard equipment used. Patch cords, volume pedals, effects devices, guitar pickups, etc. all tend to have some effect on the overall tonality and for that reason we are not able to give a "cookbook" set of equalization settings for any particular instrument. Experience has proven that **mid-range cut** is generally more pleasing to the player for most string instrument applications and a slight amount of mid-range cut is usually necessary for acoustic/electric applications due to acoustic feedback problems especially at high levels.

SHIFT CONTROL

The shift control has the ability to move the frequency where the mid-range has its effect. The sweep capability of the shift control can position the middle control at any point along the frequency spectrum between 150 Hz and 1,500 Hz. This is a very wide range of frequencies considering the fundamental frequencies of acoustic guitar. The shift control, with this broad capability, becomes one of the most functional systems with the Reno™ 400. Please be aware that the shift control works in conjunction with the mid-range control and any conditioning performed by the mid-range control is altered by the shift control. For instance, a setting on the minus (cut) position with the mid control will create a dip or a notch in the mid-range response and the shift can **relocate** this "notch" anywhere between 150 Hz and 1,500 Hz. With this notch preselected with the mid-range control you will notice that counterclockwise settings near 150 Hz with the shift will yield "thinner" sounding mids while clockwise setting will yield "fatter" sounding mids. Note also that just the opposite effect is possible when you select a boost with middle control and rotate the shift from 150 Hz to 1,500 Hz. Most acoustic guitar players will adjust the shift control in the area between 300 Hz and 800 Hz depending on the player, once again, and the equipment used.



HIGH EQ CONTROL

This control is of the active "shelving" type and provides true boost or cut in lower high frequency ranges (2 kHz). As the low and middle controls, the high EQ produces boost in the clockwise positions and cut in the counterclockwise settings while flat response is obtained in the vertical (12 o'clock) position. The action of this control is conventional but pronounced. Care should be taken not to overboost the highs since this can contribute an unpleasantly "harsh" response as described above. Boosting of this control may also cause undesirable feedback with acoustic instruments when operated near the amplifier. Notice also that there will be a slight interaction between the shift control and the high EQ control when the shift is operated up near 1,500 Hz because this places the middle control and the high control very close to each other in the frequency spectrum.

PRESENCE CONTROL

The presence control has been incorporated from several of our other models which have employed this feature over the years and is a very useful control element for acoustic guitar. The control is a conventional rotary type device but acts very similar to a "bright boost" system. Once again, this control is active with 12 dB of cut or boost and takes affect at approximately 5 KHz. Extra brightness which emphasizes silky highs may be added with this presence control in the boost position. If your preference in tonality is for no additional "sizzle" on the top end, then you may require the presence control to be operated on the "minus" or counterclockwise position. Most acoustic guitar applications require a slight amount of presence boost but it is usually in the neighborhood of only 3 to 6 dB. Once again, these settings will vary according to the equipment used and playing technique. Please be aware that additional high frequency boost may be obtained with the pull bright control also. (see explanation for pre gain/pull bright)

REVERB CONTROL

The reverb control determines the amount of delayed (reverb) signal mixed back into the output and its operation is conventional. In addition, the reverb may be switched on and off through the use of the remote footswitch. This footswitch patches into the rear panel footswitch jack and is conventional in operation. We have included a new reverb circuit featuring a "current source drive" together with a new Accutronics (Hammond) three-spring reverb unit. The calibration of this control is zero to ten and should provide more than enough reverberation for most situations.

DDT COMPRESSION LED

The Reno™ 400 is a compact and powerful amplifier that features 210 watts RMS at 4 ohms with a full compliment of equalization controls and a new type of dynamic compression. The compression effect enables us to maximize the performance of the amp/speaker/horn combination. We have determined through much research that the compression circuitry should prevent the power amplifier/speaker/horn combination from running out of headroom (clipping) and should be as simple to operate as possible to avoid undue complications for the user. Our compression circuitry is extremely effective for high level acoustic/electric operation. Because of the dynamics and percussive nature of plucked strings it is quite common to activate the compression as indicated by the active LED at reasonably low output levels. One should not be concerned that the active LED indicates compression virtually constantly during a performance when high sound pressure levels are necessary. The system was designed to maximize the dynamics available from the amp within its power output capabilities. We have not included other compression controls since we did design an exclusive distortion detection system which is patented and senses conditions which might cause overload and activates compression **only** when "clipping" is imminent. This technique effectively utilizes every precious watt available from the Reno™ 400.

PILOT LED

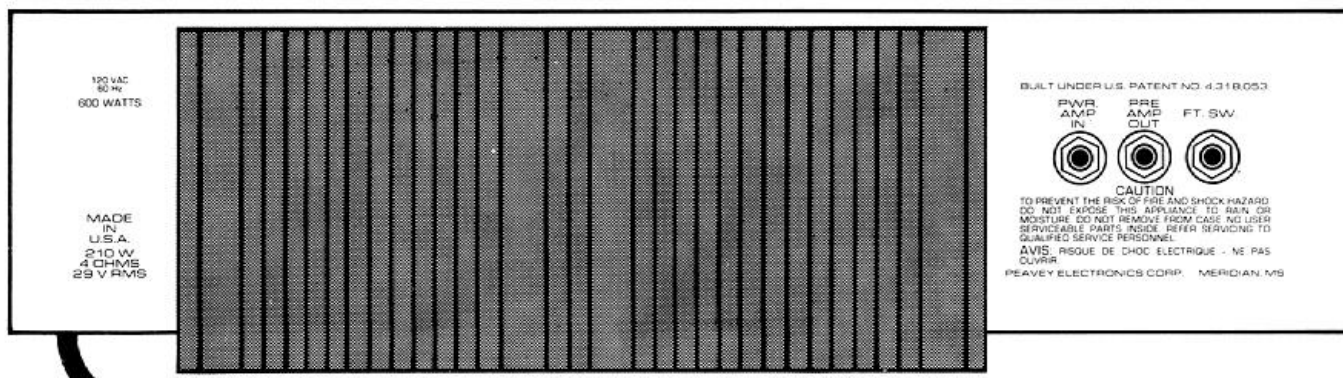
This light emitting diode (LED) indicates when the amp is switched on and actually drawing from the line (mains) connection. It is totally "solid-state" and not subject to burnouts as are incandescent types.

POLARITY SWITCH

This switch is a three position type with the center (zero) position completely removing the internal grounding capacitor from the circuit. This position is normally recommended for situations where the AC power receptacle is known to contain a properly grounded third wire. If properly grounded AC mains supply is not available, a suitable ground adaptor should be used. The plus or minus (+ or -) positions are used to ground the amplifier properly when only two wire circuits are available. One of these positions will yield the lowest amount of residual hum or popping when the instrument is touched. (NOTE: Polarity switches are not operative on export models.)

ON/OFF SWITCH

The on/off switch is a simple two position rocker type and should present no operational difficulties.



REAR PANEL

PREAMP OUT AND POWER AMP IN

To allow in-line patching of various accessories we have included a system of preamp out/power amp in jacks on the rear panel. The preamp out is a straight preamp signal which includes the entire equalization circuit plus reverb. The output level is approximately **1 volt RMS** and is relatively low - 600 ohm impedance. The preamp out signal is connected through a switching contact to the power amp input jack and normally the preamp out is internally connected to the power amp's input. This circuit allows basically two modes of operation. When signal is taken from the preamp output, it is **also delivered** to the internal power amplifier. If access to the power amplifier is needed or if some accessory device such as a noise gate, delay line, effects device, etc. is to be patched in-line, then the preamp output signal must be connected to the **auxiliary unit's input** while

the **auxiliary unit's output** must be connected to the **power amp's input** with shielded cables. This patch places the auxiliary unit "in-series" (in-line) with the normal signal path. Additional slave amp/speaker combinations should be patched using the preamp output. With this unique patching facility many interesting effects can be accomplished. Line level devices should be used with the preamp out and power amp input on the rear panel.

FOOTSWITCH JACK

The 1/4" stereo footswitch jack allows remote switching of the reverb system and also doubles as a mute system for the entire amplifier. The footswitch is a simple two function unit which merely defeats or cancels the internal reverberation capability and also mutes (defeats) the signal through the amplifier. The mute feature is **new** for most guitar amplifiers but happens to be extremely necessary with acoustic instruments which do not necessarily have level controls built-in. For instance, many acoustic/electrics have piezo transducer type pickups which are mounted internally or merely "glued on" somewhere near the bridge and these devices usually do not come with level controls. The output from these devices is usually very low and a special high impedance input is needed also. (see explanation for inputs) At any rate these acoustic/electrics which have piezo/ceramic type pickups and do not have any type of level control tend to be a problem when feedback does occur between the instrument and the amplifier. In this case, you must get back to the amplifier and turn the level down or shut the system off so you can readjust for a level or different EQ that is better for feedback. The problem is, however, that any attempt to get closer to the amplifier will usually result in louder or more emphasized feedback problems. This **mute switch capability** which has been designed into the Reno™ 400 will offer the player the convenience of muting or silencing if feedback does occur so you may go back to the amplifier and re-adjust levels and start over once again for a tonality or sound pressure level that is less susceptible to feedback problems. During concerts many times acoustic/electrics are used only for a couple of tunes at one time and then the instrument is placed on a stand and not used for several tunes. In this case, you could leave everything equalized and your volume level properly adjusted but switch the system off with the mute switch on the remote footswitch.

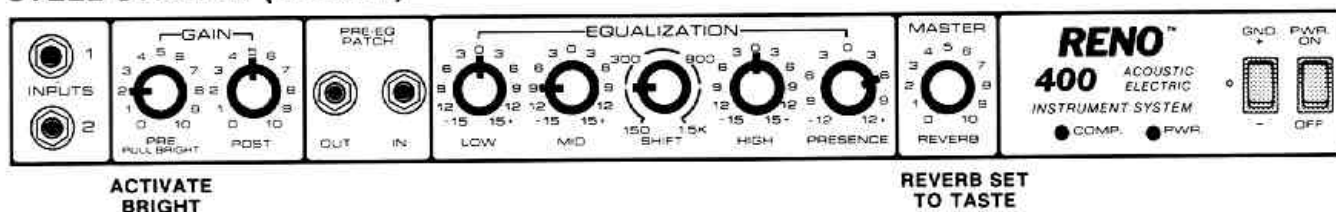
LINE CORD

For your safety we have incorporated a three-wire line (mains) cable with proper grounding facilities. It is **not advisable to remove the ground pin under any circumstances!** If it is necessary to use the amp without proper grounding receptacles a suitable grounding adaptor should be used. Much less noise and the probability of shock hazard is greatly reduced when the unit is operated with the proper grounded receptacles.

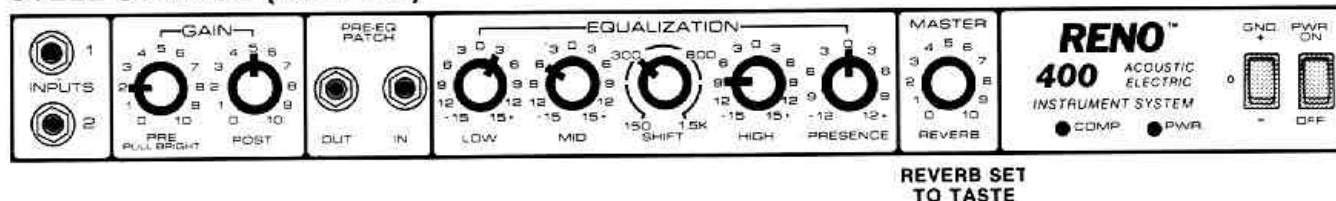
TONE SETTINGS

The tone settings given are general and will vary according to type of guitar, type and gauges of strings, type of pickup, and type of pick.

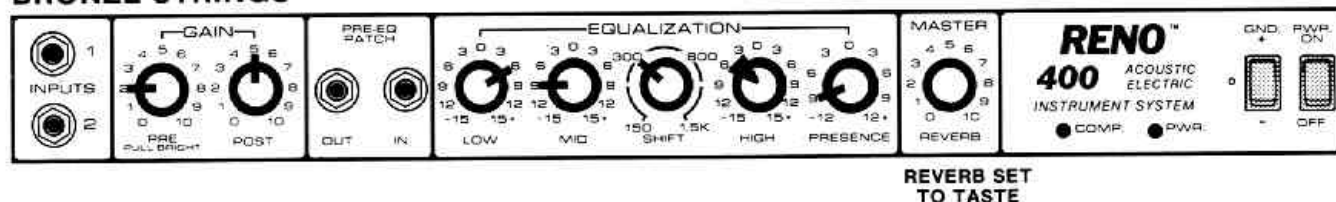
STEEL STRINGS (BRIGHT)



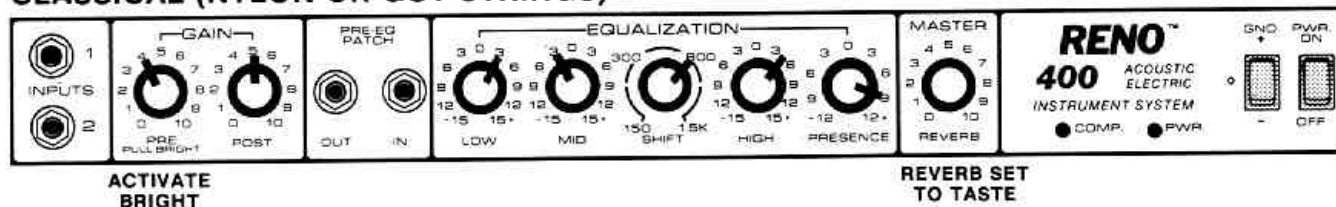
STEEL STRINGS (MELLOW)



BRONZE STRINGS



CLASSICAL (NYLON OR GUT STRINGS)



Specifications

POWER AMPLIFIER SECTION:

RATED POWER AND LOAD:

210 W RMS into 4 ohms with DDT Compression and LED indicator

POWER CLIPPING: (typically)

(5% THD, 1 KHz, 120 VAC line)
130 W RMS into 8 ohms
220 W RMS into 4 ohms
2 ohms not recommended

FREQUENCY RESPONSE:

+0, -1 dB 20 Hz to 20 KHz at 200 W RMS into 4 ohms

TOTAL HARMONIC DISTORTION:

Less than 0.2%, 100 mW to 200 W RMS, 20 Hz to 10 KHz, 4 ohms, typically below 0.1%

DDT DYNAMIC RANGE:

Greater than 20 dB

DDT MAXIMUM THD:

Below 0.5% THD for 6 dB overload
Below 1% THD for 20 dB overload

HUM & NOISE:

Greater than 95 dB below rated power

POWER CONSUMPTION: (Domestic)

600 watts, 50/60 Hz, 120 VAC

PREAMP SECTION:

THE FOLLOWING SPECS ARE MEASURED AT 1 KHz
WITH THE CONTROLS PRESET AS FOLLOWS:

Pre Gain Pull Bright Off (In)
Post Gain at 10
Low EQ at +6 dB
Mid EQ at -9 dB
Shift at 300 Hz
High EQ at +3 dB
Presense EQ at +6 dB
Reverb at 0

Nominal levels are with Pre Gain at 5

Minimal levels are with pre Gain at 10

PREAMP #1 INPUT: (for transducer type pickups)

Impedance: Very high Z, 2.2 MEG ohms
Nominal Input Level: -34 dBV, 20 mV RMS
Minimum Input Level: -51 dBV, 3 mV RMS
Maximum Input Level: 0 dBV, 1 V RMS

PREAMP #2 INPUT: (for guitars with integral preamps)

Impedance: High Z, 2.2 MEG ohms
Nominal Input Level: -24 dBV, 60 mV RMS
Minimum Input Level: -41 dBV, 9 mV RMS
Maximum Input level: +10 dBV, 3 V RMS

BOTH #1 and #2 INPUTS: (for two guitars with preamps)

Impedance: High Z, 44K ohms
Nominal Input Level: -18 dBV, 120 mV RMS
Minimum Input Level: -35 dBV, 18 mV RMS
Maximum Input Level: +16 dBV, 6 V RMS

PATCH OUTPUT:

FUNCTION: LOW LEVEL PRE-EQ EFFECTS SEND

Load Impedance: 10K ohms or greater
Nominal Output: -14 dBV, 0.2 V RMS

PATCH INPUT:

FUNCTION: LOW LEVEL PRE-EQ EFFECTS RETURN

Impedance: High Z, 220K ohms
Designed Input Level: -14 dBV, 0.2 V RMS
(Switching jack providing patch output to patch input connection when not used)

PREAMP OUTPUT:

FUNCTION: HIGH LEVEL POST EQ SIGNAL SEND

Load Impedance: 1K ohms or greater
Nominal Output: 0 dBV, 1 V RMS
Maximum Output: +18 dBV, 8 V RMS

POWER AMP INPUT:

FUNCTION: HIGH LEVEL POST EQ SIGNAL RETURN

Impedance: High Z, 22K ohms
Designed Input Level: 0 dBV, 1 V RMS
(Switching jack providing preamp output to power amp input connection when not used)

SYSTEM HUM AND NOISE AT NOMINAL INPUT LEVEL:

(20 Hz to 20 KHz unweighted, #1 input usage)
75 dB below rated power

EQUALIZATION:

LOW: +-15 dB at 100 Hz, shelving

MID: +-15 dB (with Shift frequency), Peak/Notch

SHIFT: 150 Hz to 1,500 Hz

HIGH: +-15 dB at 2 KHz (special EQ)

PRESENCE: +-15 dB at 5 KHz, shelving

PULL BRIGHT: +6 dB at 2 KHz

FOOTSWITCH:

Reverb defeat and system mute

Due to our efforts for constant improvement, features and specifications listed herein are subject to change without notice.

DANGER

EXPOSURE TO EXTREMELY HIGH NOISE LEVELS MAY CAUSE A PERMANENT HEARING LOSS. INDIVIDUALS VARY CONSIDERABLY IN SUSCEPTIBILITY TO NOISE INDUCED HEARING LOSS, BUT NEARLY EVERYONE WILL LOSE SOME HEARING IF EXPOSED TO SUFFICIENTLY INTENSE NOISE FOR A SUFFICIENT TIME.

THE U.S. GOVERNMENT'S OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION (OSHA) HAS SPECIFIED THE FOLLOWING PERMISSIBLE NOISE LEVEL EXPOSURES:

DURATION PER DAY IN HOURS

8
6
4
3
2
1½
1
½
¼ or less

SOUND LEVEL dBA, SLOW RESPONSE

90
92
95
97
100
102
105
110
115

ACCORDING TO OSHA, ANY EXPOSURE IN EXCESS OF THE ABOVE PERMISSIBLE LIMITS COULD RESULT IN SOME HEARING LOSS.

EAR PLUGS OR PROTECTORS IN THE EAR CANALS OR OVER THE EARS MUST BE WORN WHEN OPERATING THIS AMPLIFICATION SYSTEM IN ORDER TO PREVENT A PERMANENT HEARING LOSS IF EXPOSURE IS IN EXCESS OF THE LIMITS SET FORTH ABOVE. TO INSURE AGAINST POTENTIALLY DANGEROUS EXPOSURE TO HIGH SOUND PRESSURE LEVELS, IT IS RECOMMENDED THAT ALL PERSONS EXPOSED TO EQUIPMENT CAPABLE OF PRODUCING HIGH SOUND PRESSURE LEVELS SUCH AS THIS AMPLIFICATION SYSTEM BE PROTECTED BY HEARING PROTECTORS WHILE THIS UNIT IS IN OPERATION.

CAUTION

THIS AMPLIFIER HAS BEEN DESIGNED AND CONSTRUCTED TO PROVIDE ADEQUATE POWER RESERVE FOR PLAYING MODERN MUSIC WHICH MAY REQUIRE OCCASIONAL PEAK POWER. TO HANDLE OCCASIONAL PEAK POWER, ADEQUATE POWER "HEADROOM" HAS BEEN DESIGNED INTO THIS SYSTEM. EXTENDED OPERATION AT ABSOLUTE MAXIMUM POWER LEVELS IS NOT RECOMMENDED SINCE THIS COULD DAMAGE THE ASSOCIATED LOUDSPEAKER SYSTEM. PLEASE BE AWARE THAT **MAXIMUM POWER** CAN BE OBTAINED WITH VERY LOW SETTINGS OF THE GAIN CONTROLS IF THE INPUT SIGNAL IS VERY STRONG.

1. Read all safety and operating instructions before using this product.
2. All safety and operating instructions should be retained for future reference.
3. Obey all cautions in the operating instructions and on the back of the unit.
4. All operating instructions should be followed.
5. This product should not be used near water, i.e. a bathtub, sink, swimming pool, wet basement, etc.
6. This product should be located so that its position does not interfere with its proper ventilation. It should not be placed flat against a wall or placed in a built-in enclosure that will impede the flow of cooling air.
7. This product should not be placed near a source of heat such as a stove, heater, radiator or another heat producing amplifier.
8. Connect only to a power supply of the type marked on the unit adjacent to the power supply cord.
9. Never break off the ground pin on the power supply cord. For more information on grounding, write for our free booklet "Shock Hazard and Grounding."
10. Power supply cords should always be handled carefully. Never walk or place equipment on power supply cords. Periodically check cords for cuts or signs of stress, especially at the plug and the point where the cord exits the unit.
11. The power supply cord should be unplugged when the unit is to be unused for long periods of time.
12. Metal parts can be cleaned with a damp rag. The vinyl covering used on some units can be cleaned with a damp rag, or an ammonia based household cleaner if necessary.
13. Care should be taken so that objects do not fall and liquids are not spilled into the unit through the ventilation holes or any other openings.
14. This unit should be checked by a qualified service technician if:
 - A. The power supply cord or plug has been damaged.
 - B. Anything has fallen or been spilled into the unit.
 - C. The unit does not operate correctly.
 - D. The unit has been dropped or the enclosure damaged.
15. The user should not attempt to service this equipment. All service work should be done by a qualified service technician.



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