

HDH™

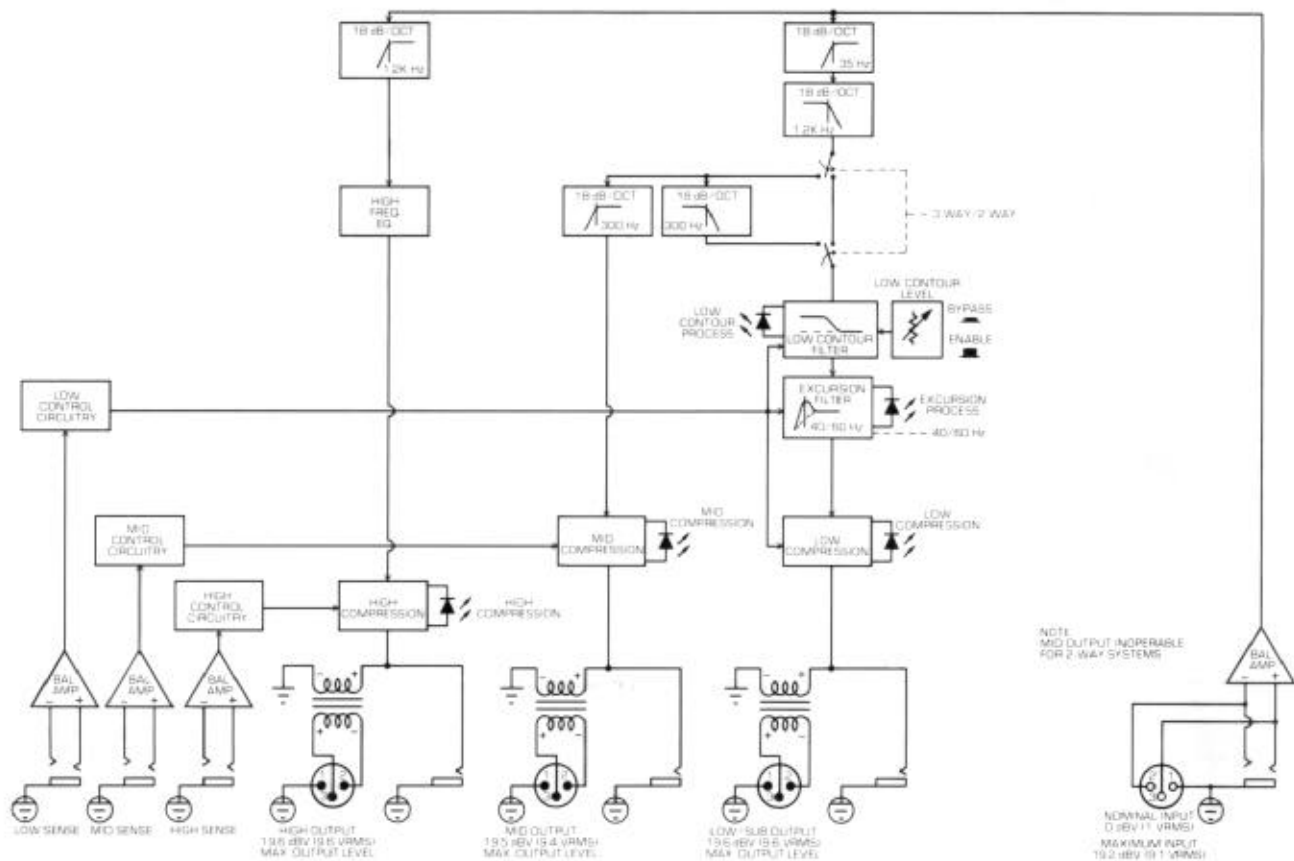


PROCESSOR CONTROLLED SYSTEM

OPERATING GUIDE

CAUTION

TO PREVENT ELECTRICAL SHOCK, DO NOT EXPOSE THIS INSTRUMENT TO RAIN OR MOISTURE. BEFORE USING THIS INSTRUMENT, READ BACK COVER FOR FURTHER WARNINGS.



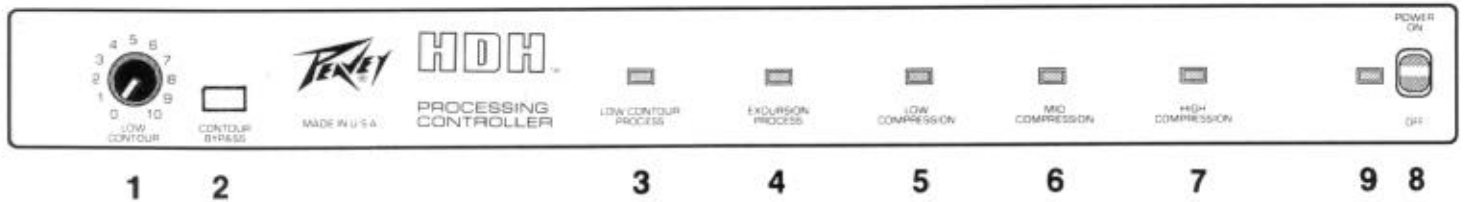
BLOCK DIAGRAM

This block diagram shows the signal flow within the unit. In order to thoroughly understand the unit's functions, please study the block diagram carefully.

NOTE: The HDH™ Processor has been optimized to work with HDH™-1, HDH™-2, HDH™-3, HDH™-4 and HDH™-M Enclosures.

CROSSOVER/PROCESSOR FUNCTIONS

The HDH is a "dedicated," active electronic crossover which can be operated in 2-way or 3-way modes. Processing is accomplished via feedback signals from the power amplifiers to provide system protection and to optimize speaker system performance by varying the low frequency contour ("loudness") and the excursion filters.



FRONT PANEL

LOW CONTOUR (1)

Used to adjust the amount of low frequency boost added to the system. Processing functions render this control less effective at higher operating levels.

CONTOUR BYPASS (2)

Low frequency boost is defeated when the button is pressed in. Select the defeat position when adjusting system equalization.

LOW CONTOUR PROCESS (3)

Illuminates when process is occurring. NOTE: Low contour process occurs when low frequency boost is being reduced for system protection and approaches a more flat system response.

EXCURSION PROCESS (4)

Illuminates when process is occurring. NOTE: Excursion process indicates a shift upward of the high pass filter in the amount necessary to provide loudspeaker protection and reduced non-linear distortion associated with excessive cone movement.

LOW COMPRESSION (5)

Illuminates to indicate when the limit of safe power handling has been reached for the low pass section and that the power level of the low pass will increase no further.

MID COMPRESSION (6)

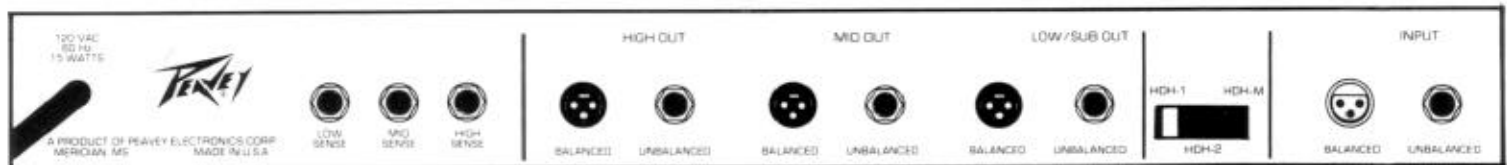
Illuminates to indicate when the limit of safe power handling has been reached for the mid pass section and that the power level of the mid pass will increase no further. This is active only in 3-way operation.

HIGH COMPRESSION (7)

Illuminates to indicate when the limit of safe power handling has been reached for the high pass section and that the power level of the high pass will increase no further.

POWER SWITCH (8) and POWER LED (9)

Depress the switch to the "On" position. The red pilot light (LED) will illuminate indicating power is being supplied to the unit.



22 21 20 19 18 17 16 15 14 13 12 11 10

REAR PANEL

INPUT (UNBALANCED) (10)

1/4" phone jack is provided. Use of this jack defeats the Low Z input.

INPUT (BALANCED) (11)

An electronically balanced input (Pin 3 positive). This input is defeated when the unbalanced 1/4" input is used.

MODE SELECTION SWITCH (12)

Allows selection of 2-way or 3-way operation modes. Either 2-way mode selection defeats the "MID OUT" jacks.

LOW/SUB OUT (UNBALANCED) (13)

A 1/4" phone jack output for the low pass.

LOW/SUB OUT (BALANCED) (14)

A transformer balanced, male XLR output for the low pass.

MID OUT (UNBALANCED) (15)

A 1/4" phone jack output for the mid pass. Not active when the mode switch is in either 2-way position.

MID OUT (BALANCED) (16)

A transformer balanced, male XLR output for the mid pass. Not active when the mode switch is in either 2-way position.

HIGH OUT (UNBALANCED) (17)

A 1/4" phone jack output for the high pass.

HIGH OUT (BALANCED) (18)

A transformer balanced, male XLR output for the high pass.

SENSE INPUTS: HIGH (19), MID (20), LOW (21)

Each has one 1/4" stereo jack and is electronically balanced to allow use of bridged amplifiers for any band pass. Each should be used with standard phone plugs (as supplied) unless bridged amplifiers are used in the system. See Figure 3 for wiring configuration for stereo phone plug use. See Figure 1 and Figure 2 for hookup procedure for 2-way and 3-way operation.

LINE CORD (22)

(120V products only)

For your safety, we have incorporated a 3-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 equipment without proper grounding facilities, suitable grounding adaptors should be used. Less noise and greatly reduced shock hazard exists when the unit is operated with the proper grounded receptacles.

SET-UP AND OPERATION

The HDH should be located near the system power amplifiers, in the same equipment rack whenever possible. This keeps the interconnecting cables to a minimum length.

The Low, Mid, and High Pass outputs may be connected to the power amplifiers via the balanced XLR or unbalanced 1/4" jacks. If the HDH cannot be located near the power amplifiers, the balanced outputs should be used.

Connection to the HDH input should be via the balanced XLR input for most applications to assure quiet, interference-free operation. In the signal path, the HDH comes immediately before the power amplifiers and after the system equalization.

Before making any cable connections, select the appropriate position of the 2-way/3-way Mode Switch (12).

TWO-WAY MODE

Connection should be as shown in Figure 1. If the power amp used has only one 1/4" output jack and a pair of binding posts, the "sense" cable should be connected via the 1/4" jack and the speaker cable should be connected via the binding posts.

In this mode, the Mid Out jacks will not be used.

THREE-WAY MODE

This mode is to be selected when the HDH 1 or HDH 4/HDH 3 combinations are used. Connection should be as shown in Figure 2.

SENSE LINES

Three 18 gauge, two-conductor cables with 1/4" plugs are provided with the HDH for connection of the sense inputs.

If bridged (bridge-mode) power amps are used for any bandpass in the system, these cables will not work for that bandpass. 1/4" stereo plugs should be used and wired as shown in Figure 3.

MULTIPLE AMP SYSTEMS

Each bandpass output can drive at least six amplifiers (10K input impedance). Ideally, all the amplifiers used on a particular bandpass should be the same. If they are not the same, the sense line should come from the amp with the highest gain used on that bandpass to insure protection for the entire speaker system. Only one sense line for each bandpass is used.

LOW CONTOUR ADJUSTMENT

The amount of low contour (low frequency boost) is variable to tailor the response to individual tastes or listening environments. Low Contour should be defeated via the bypass switch during system equalization.

POWER AMP REQUIREMENTS

Because the HDH is capable of extreme low frequency compensation, a minimum amplifier rating of 250 watts at 8 ohms is strongly recommended. The combination of the HDH processor and sufficient amplifier headroom will guarantee maximum system performance and transducer protection.

HDH™ SPECIFICATIONS:

Crossover Frequency:

1.2 kHz (two-way mode)
1.2 kHz, 300 Hz (three-way mode)

Crossover Type:

Modified, third order Butterworth
(18 dB per octave)

Input Impedance:

47K ohms, balanced

Frequency Response:

38 Hz to 20 kHz (sense inactivated)

Total Harmonic Distortion:

Less than .01% 38Hz to 20 kHz
(sense inactivated)

Signal to Noise Ratio:

Greater than 90 dB 38 Hz to 20 kHz
(sense inactivated)

Power Requirements:

120 VAC, 40 watts, 60 Hz

Dimensions:

19" W x 1.75" H x 9" D

Weight:

8.5 lbs.

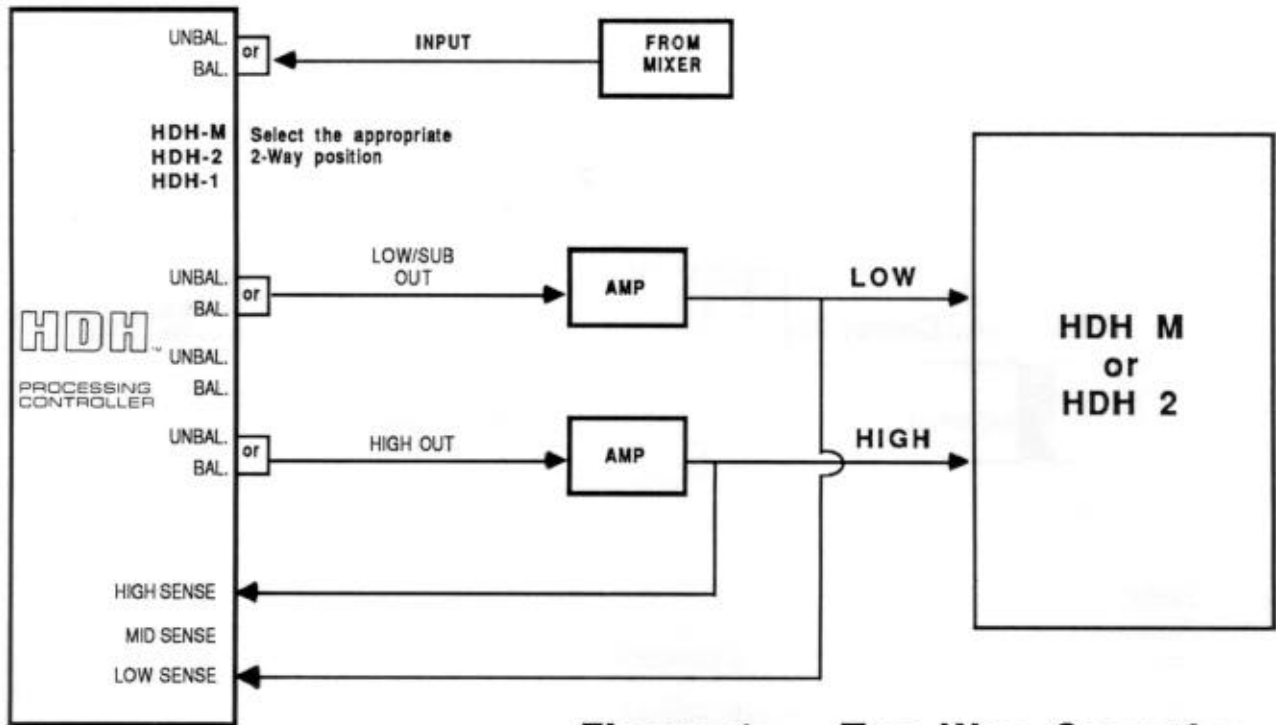


Figure 1: Two-Way Operation

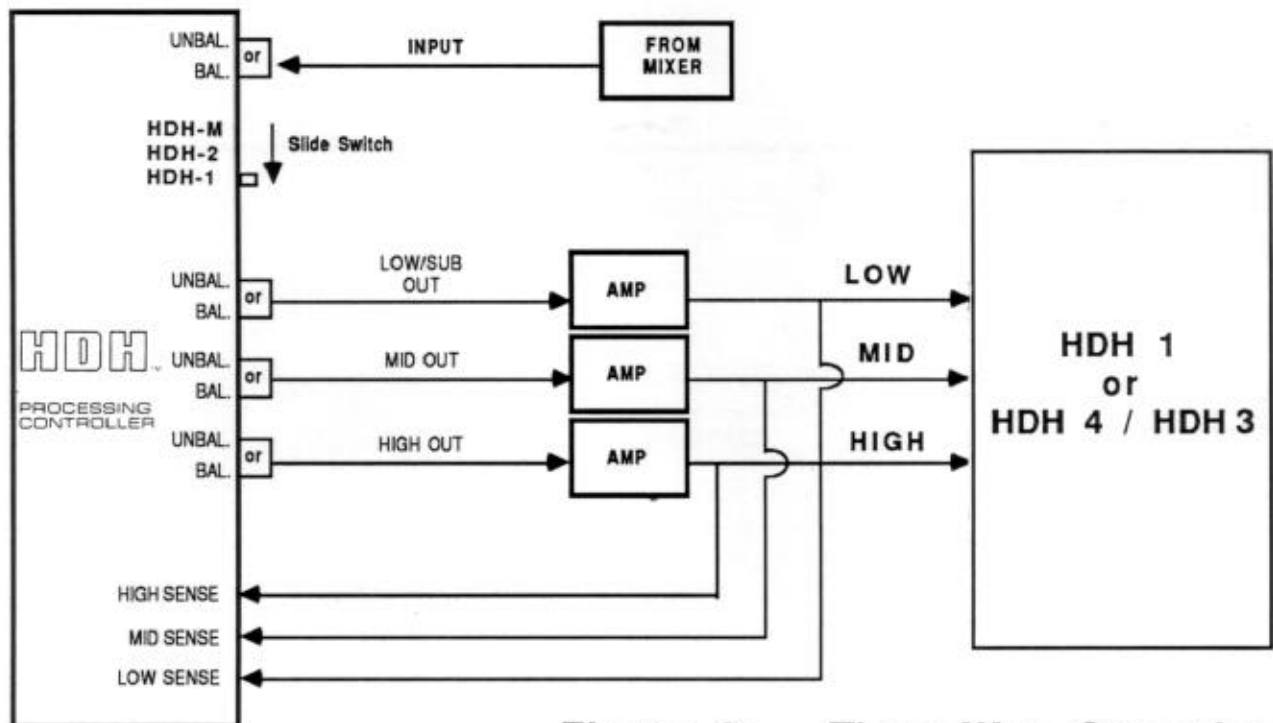


Figure 2: Three-Way Operation

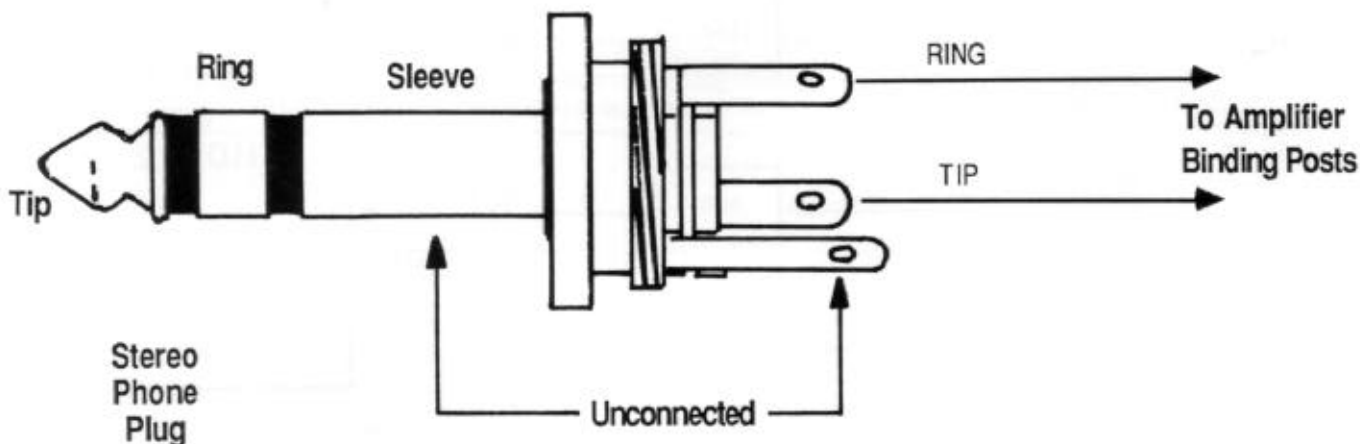


Figure 3

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	SOUND LEVEL (dBA, SLOW RESPONSE)
8	90
6	95
4	97
3	100
2	102
1 1/2	105
1	110
3/4	115
1/2 or less	

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 AS 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 MIXING CONSOLE EFFECTS DEVICE/PREAMP HAS BEEN DESIGNED AND CONSTRUCTED TO PROVIDE ADEQUATE SIGNAL (VOLTAGE) FOR PLAYING MODERN MUSIC. IMPROPER USE OF THE GAIN/EQUALIZER CONTROLS AND/OR IMPROPER USE OF INTERNAL/EXTERNAL BUSES MAY CREATE CLIPPING (SQUARE WAVES) AND POSSIBLY CAUSE SUBSEQUENT DAMAGE TO THE LOUDSPEAKER SYSTEMS. EXTENDED OPERATION OF THE GAIN/EQUALIZATION CONTROLS IN THEIR MAXIMUM POSITIONS IS THEREFORE NOT RECOMMENDED. PLEASE BE AWARE THAT MAXIMUM POWER CAN BE OBTAINED WITH VERY LOW SETTINGS OF THE GAIN/EQUALIZATION CONTROLS IF THE INPUT SIGNAL IS VERY STRONG.

IT IS COMMON PRACTICE AMONG USERS OF SOUND REINFORCEMENT EQUIPMENT TO IDENTIFY THE INDIVIDUAL CHANNELS WITH A STRIP OF TAPE PLACED ABOVE OR BELOW THE ROW OF VOLUME FADERS. MANY TYPES OR BRANDS OF TAPE HAVE A VERY STRONG ADHESIVE WHICH CAN INHIBIT THE PAINT ON THE FACEPLATE AND ACTUALLY REMOVE THE PAINT WHEN THE TAPE IS REMOVED. WE STRONGLY RECOMMEND THAT SCOTCH TAPE NOT BE USED ON PAINTED SURFACES NOR ANY OTHER TAPE THAT IS NOT ESPECIALLY DESIGNED FOR ELONG APPLICATIONS. MEDIUM OR LIGHT ADHESIVE MASKING OR MIXER LABEL TAPE IS RECOMMENDED IF TAPE IS USED. ANY TAPE LEFT ON PAINTED SURFACE FOR EXTENDED PERIODS WILL BE DIFFICULT TO REMOVE. NEVER USE CLEAR OR SCOTCH TAPE FOR THESE APPLICATIONS.

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, 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. If this product is to be mounted in an equipment rack, rear support should be provided.
13. 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.
14. 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.
15. 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.
16. The user should not attempt to service this equipment. All service work should be done by a qualified service technician.



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

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