

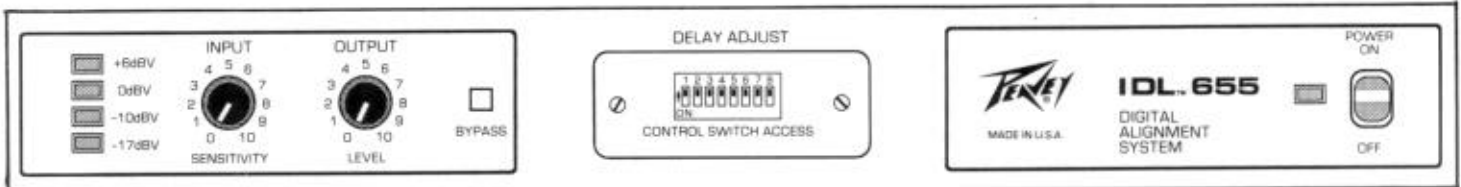


IDL™ 655

DIGITAL ALIGNMENT
SYSTEM

OPERATING GUIDE

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



FRONT PANEL

INPUT SENSITIVITY

Used together with the Input LED Array to properly match the input sensitivity to the input signal level. Correct adjustment is achieved when the 0 dBV LED flashes frequently and the +6 dBV LED flashes only on the highest signal peaks. Proper adjustment of the Input Sensitivity control will yield minimum distortion and maximum signal-to-noise performance.

Operation Note: This control should be used only to set the input sensitivity. Level or "volume" adjustments should be made by varying the Output Level control.

OUTPUT LEVEL

Adjust to meet the input requirements of the next stage in the audio chain. (Usually the power amplifier.) For power amps not equipped with level controls, the Output Level is used to set the system level. For power amps with level controls, the Output Level should be set at maximum in order to gain optimum signal-to-noise performance. **Adjust this control only after the Input Sensitivity control has been properly adjusted.**

BYPASS

In bypass mode, the Delay Output becomes a direct out which is unaffected by the Level Switch and front panel controls.

Operation Note: The Delay Output is automatically in the bypass mode whenever AC power is not applied (switch off, power cord disconnected, etc.)

DELAY ADJUST

Adjustment is via the eight position DIP switch located behind the Control Switch Access cover. Switches should be gently moved to the proper positions to achieve the desired delay time. (See Delay Adjustment table.) Replace the access cover after completing adjustment.

POWER SWITCH

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



REAR PANEL

INPUT (Balanced)

A three-pin female XLR jack is provided for balanced input termination.

INPUT (Unbalanced)

A ¼" Ring-Tip-Sleeve (Stereo) jack which provides a balanced input when used with a stereo (RTS) ¼" plug and balanced cable. When used with a mono ¼" phone plug, the input is unbalanced.

LEVEL SWITCH

Select the -20 dBV position when necessary to prevent overdriving the input.

BALANCED OUTPUT (Direct Out)

Non-delayed direct output. Output signal is not affected by the Level Switch or the front panel controls.

BALANCED OUTPUT (Delay Out)

Delayed signal output. In bypass mode this becomes a direct out.

LINE CORD (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.

VOLTAGE SELECTOR SWITCH

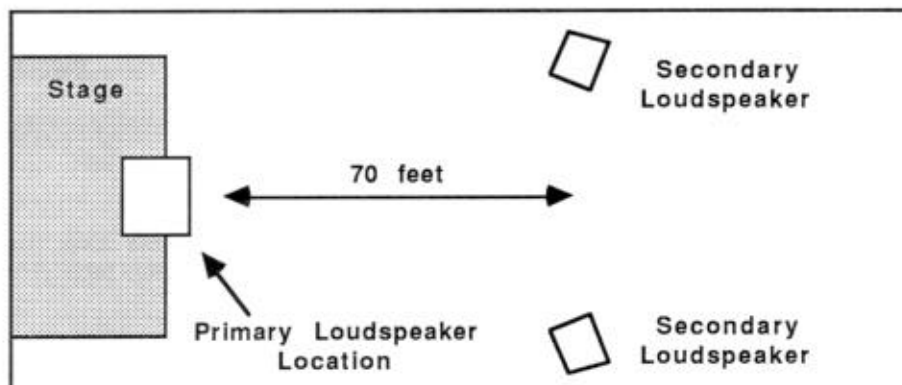
Export models of this product are equipped with a 220/240 volt selector switch. Before operating this product, be sure the switch is set to the correct voltage. NOTE: Operating this product at an incorrect voltage setting may cause transformer damage or loss of output power.

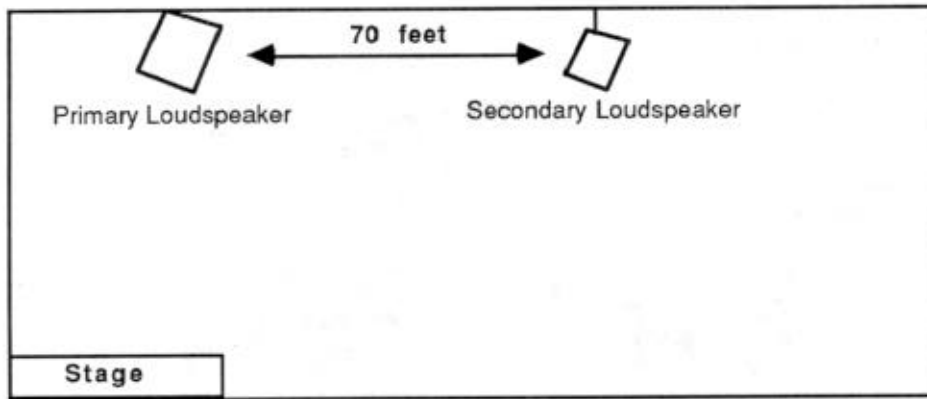
DELAY ADJUSTMENT PROCEDURE

Measure the distance (in feet) from the primary loudspeaker to the delay loudspeaker. Locate the "Distance" value in the Delay Adjustment Table which is closest to the measured distance. The corresponding delay time for that distance (adjacent column) is the delay value, in milliseconds, which would "time align" the two loudspeakers. In order to take advantage of "Haas Effect," the actual delay time used should be approximately 20 milliseconds (mS) longer than what is called for on the Delay Adjustment Table. (See Haas Effect).

Example #1

A room is equipped with a point-source primary loudspeaker system near one end of the room. Secondary coverage loudspeakers are located half the distance from the other end of the room, 70 feet from the point source system.





According to the Delay Adjustment Table, the delay time for 70 feet (70.4) is 64 mS. Adding 20 mS to this calls for 84 mS delay time. Since the nearest available value is 84.4 mS, this is the appropriate delay setting for this application. Carefully move the DIP switches to the positions indicated on the table for 84.4 mS.

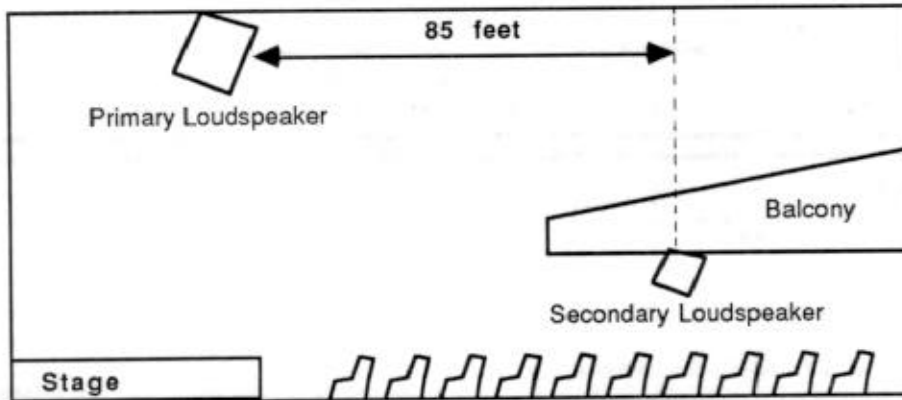
SW1	SW2	SW3	SW4	SW5	SW6	SW7	SW8	TIME (mS)	DIST. (feet)
	●	●	●	●				79.3	87.296
●	●	●	●	●				81.9	90.112
					●			84.4	92.928
●					●			87	95.74401
	●				●			89.6	98.56001

● = ON

Example #2

A room's under-balcony area is blocked from the primary loudspeaker and requires secondary balcony speakers. The distance from the primary loudspeaker to the balcony loudspeaker is 85 feet.

The Delay Adjustment Table indicates a delay time of 76.7 mS for the distance value closest to 85 feet (84.48). Again, to take advantage of Haas Effect, add 20 mS to 76.7 mS and use the delay setting for 97.2 mS (the nearest setting to 96.7 mS).



SW1	SW2	SW3	SW4	SW5	SW6	SW7	SW8	TIME (mS)	DIST. (feet)
●	●				●			92.1	101.376
		●			●			94.7	104.192
●		●			●			97.2	107.008
	●	●			●			99.8	109.824
●	●	●			●			102.3	112.64

● = ON

HAAS EFFECT

Due to the nature of human hearing and the way we perceive sound, we "use" the information received in the first 20 milliseconds of what we hear. In situations such as the above examples where the listener is in a position to hear the same sound from two sources at the same time and amplitude, the nearest source may be predominant. This condition can be distracting to the listener since sound coming from the area nearest the primary speaker location would be more "natural." Adding the additional 20 milliseconds of delay time to the nearby secondary loudspeakers effectively moves the *perceived* source of all the sound to the primary loudspeaker location.

Delay Adjustment Table

SW1	SW2	SW3	SW4	SW5	SW6	SW7	SW8	TIME (mS)	DIST. (feet)
								2.5	2.816
●								5.1	5.632
	●							7.6	8.448
●	●							10.2	11.264
		●						12.7	14.08
●		●						15.3	16.896
	●	●						17.9	19.712
●	●	●						20.4	22.528
			●					23	25.344
●			●					25.5	28.16
	●		●					28.1	30.976
●	●		●					30.7	33.792
		●	●					33.2	36.608
●		●	●					35.8	39.424
	●	●	●					38.3	42.24
●	●	●	●					40.9	45.056
				●				43.5	47.872
●				●				46	50.688
	●			●				48.6	53.504
●	●			●				51.1	56.32
		●		●				53.7	59.136
●		●		●				56.3	61.95201
	●	●		●				58.8	64.768
●	●	●		●				61.4	67.584
			●	●				64	70.4
●			●	●				66.5	73.21601
	●		●	●				69.1	76.032
●	●		●	●				71.6	78.848
		●	●	●				74.2	81.664
●		●	●	●				76.7	84.47999
	●	●	●	●				79.3	87.296
●	●	●	●	●				81.9	90.112
					●			84.4	92.928
●					●			87	95.74401
	●				●			89.6	98.56001
●	●				●			92.1	101.376
		●			●			94.7	104.192
●		●			●			97.2	107.008
	●	●			●			99.8	109.824
●	●	●			●			102.3	112.64
			●		●			104.9	115.456
●			●		●			107.5	118.272
	●		●		●			110	121.088
●	●		●		●			112.6	123.904
		●	●		●			115.2	126.72
●		●	●		●			117.7	129.536
	●	●	●		●			120.3	132.352
●	●	●	●		●			122.8	135.168
				●	●			125.4	137.984
●				●	●			128	140.8
	●			●	●			130.5	143.616
●	●			●	●			133.1	146.432
		●		●	●			135.6	149.248
●		●		●	●			138.2	152.064
	●	●		●	●			140.7	154.88
●	●	●		●	●			143.3	157.696
			●	●	●			145.9	160.512
●			●	●	●			148.4	163.328
	●		●	●	●			151	166.144
●	●		●	●	●			153.5	168.96
		●	●	●	●			156.1	171.776
●		●	●	●	●			158.7	174.592
	●	●	●	●	●			161.2	177.408
●	●	●	●	●	●			163.8	180.224

● - ON

SW1	SW2	SW3	SW4	SW5	SW6	SW7	SW8	TIME (mS)	DIST. (feet)
						●		166.4	183.04
●						●		168.9	185.856
	●					●		171.5	188.672
●	●					●		174	191.488
		●				●		176.6	194.304
●		●				●		179.2	197.12
	●	●				●		181.7	199.936
●	●	●				●		184.3	202.752
			●			●		186.8	202.568
●			●			●		189.4	208.384
	●		●			●		192	211.2
●	●		●			●		194.5	214.016
		●	●			●		197.1	216.832
●		●	●			●		199.6	219.648
	●	●	●			●		202.2	222.464
●	●	●	●			●		204.7	225.28
				●		●		207.3	228.096
●				●		●		209.9	230.912
	●			●		●		212.4	233.728
●	●			●		●		215	236.544
		●		●		●		217.6	239.36
●		●		●		●		220.1	242.176
	●	●		●		●		222.7	244.992
●	●	●		●		●		225.2	247.808
			●	●		●		227.8	250.624
●			●	●		●		230.4	253.44
	●		●	●		●		232.9	256.256
●	●		●	●		●		235.5	259.072
		●	●	●		●		238	261.888
●		●	●	●		●		240.6	264.704
	●	●	●	●		●		243.2	267.52
●	●	●	●	●		●		245.7	270.336
					●	●		248.3	273.152
●					●	●		250.8	275.968
	●				●	●		253.4	278.784
●	●				●	●		256	281.6
		●			●	●		258.5	284.416
●		●			●	●		261.1	287.232
	●	●			●	●		263.6	290.048
●	●	●			●	●		266.2	292.864
			●		●	●		268.8	295.68
●			●		●	●		271.3	298.496
	●		●		●	●		273.9	301.312
●	●		●		●	●		276.4	304.128
		●	●		●	●		279	306.944
●		●	●		●	●		281.5	309.76
	●	●	●		●	●		284.1	312.576
●	●	●	●		●	●		286.7	315.392
				●	●	●		289.2	318.208
●				●	●	●		291.8	321.024
	●			●	●	●		294.4	323.84
●	●			●	●	●		296.9	326.656
		●		●	●	●		299.5	329.472
●		●		●	●	●		302	332.288
	●	●		●	●	●		304.6	335.104
●	●	●		●	●	●		307.1	337.92
			●	●	●	●		309.7	340.736
●			●	●	●	●		312.3	343.552
	●		●	●	●	●		314.8	346.368
●	●		●	●	●	●		317.4	349.184
		●	●	●	●	●		320	352
●		●	●	●	●	●		322.5	354.816
	●	●	●	●	●	●		325.1	357.632
●	●	●	●	●	●	●		327.6	360.448

SW1	SW2	SW3	SW4	SW5	SW6	SW7	SW8	TIME (mS)	DIST. (feet)
							●	330.2	363.264
●							●	332.8	366.08
	●						●	335.3	368.896
●	●						●	337.9	371.712
		●					●	340.4	374.528
●		●					●	343	377.344
	●	●					●	345.5	380.16
●	●	●					●	348.1	382.976
			●				●	350.7	385.792
●			●				●	353.2	388.608
	●		●				●	355.8	391.424
●	●		●				●	358.4	394.24
		●	●				●	360.9	397.056
●		●	●				●	363.5	399.872
	●	●	●				●	366	402.688
●	●	●	●				●	368.6	405.504
				●			●	371.1	408.32
●				●			●	373.7	411.136
	●			●			●	376.3	413.952
●	●			●			●	378.8	416.768
		●		●			●	381.4	419.584
●		●		●			●	384	422.4
	●	●		●			●	386.5	425.2161
●	●	●		●			●	389.1	428.032
			●	●			●	391.6	430.848
●			●	●			●	394.2	433.6641
	●		●	●			●	396.8	436.48
●	●		●	●			●	399.3	439.296
		●	●	●			●	401.9	442.112
●		●	●	●			●	404.4	444.928
	●	●	●	●			●	407	447.744
●	●	●	●	●			●	409.5	450.56
					●		●	412.1	453.376
●					●		●	414.7	456.192
	●				●		●	417.2	459.0081
●	●				●		●	419.8	461.824
		●			●		●	422.4	464.64
●		●			●		●	424.9	467.456
	●	●			●		●	427.5	470.272
●	●	●			●		●	430	473.088
			●		●		●	432.6	475.904
●		●			●		●	435.2	478.72
	●	●			●		●	437.7	481.536
●	●				●		●	440.3	484.352
		●	●		●		●	442.8	487.1681
●		●	●		●		●	445.4	489.984
	●	●	●		●		●	448	492.8
●	●	●	●		●		●	450.5	495.6161
				●	●		●	453.1	498.432
●				●	●		●	455.6	501.248
	●			●	●		●	458.2	504.064
●	●			●	●		●	460.8	506.88
		●		●	●		●	463.3	509.696
●		●		●	●		●	465.9	512.5121
	●	●		●	●		●	468.4	515.328
●	●	●		●	●		●	471	518.144
			●	●	●		●	473.6	520.9601
●			●	●	●		●	476.1	523.776
	●		●	●	●		●	478.7	526.592
●	●		●	●	●		●	481.2	529.408
		●	●	●	●		●	483.8	532.224
●		●	●	●	●		●	486.4	535.0401
	●	●	●	●	●		●	488.9	537.856
●	●	●	●	●	●		●	491.5	540.672

● - ON

SW1	SW2	SW3	SW4	SW5	SW6	SW7	SW8	TIME (mS)	DIST. (feet)
						●	●	494	543.4881
●						●	●	496.6	546.304
	●					●	●	499.2	549.12
●	●					●	●	501.7	551.9361
		●				●	●	504.3	554.752
●		●				●	●	506.8	557.568
	●	●				●	●	509.4	560.3841
●	●	●				●	●	512	563.2
			●			●	●	514.5	566.0161
●			●			●	●	517.1	568.8321
	●		●			●	●	519.6	571.648
●	●		●			●	●	522.2	574.4641
		●	●			●	●	524.8	577.28
●		●	●			●	●	527.3	580.096
	●	●	●			●	●	529.9	582.912
●	●	●	●			●	●	532.4	585.728
				●		●	●	535	588.544
●				●		●	●	537.6	591.36
	●			●		●	●	540.1	594.176
●	●			●		●	●	542.7	596.992
		●		●		●	●	545.2	599.808
●		●		●		●	●	547.8	602.624
	●	●		●		●	●	550.3	605.44
●	●	●		●		●	●	552.9	608.256
			●	●		●	●	555.5	611.072
●			●	●		●	●	558	613.888
	●		●	●		●	●	560.6	616.7041
●	●		●	●		●	●	563.1	619.52
		●	●	●		●	●	565.7	622.336
●		●	●	●		●	●	568.3	625.1621
	●	●	●	●		●	●	570.8	627.9881
●	●	●	●	●		●	●	573.4	630.784
					●	●	●	576	633.6001
●					●	●	●	578.5	636.416
	●				●	●	●	581.1	639.232
●	●				●	●	●	583.6	642.0481
		●			●	●	●	586.2	644.864
●		●			●	●	●	588.8	647.68
	●	●			●	●	●	591.3	650.4961
●	●	●			●	●	●	593.9	653.312
			●		●	●	●	596.4	656.128
●			●		●	●	●	599	658.944
	●		●		●	●	●	601.6	661.76
●	●		●		●	●	●	604.1	664.576
		●	●		●	●	●	606.7	667.392
●		●	●		●	●	●	609.2	670.208
	●	●	●		●	●	●	611.8	673.024
●	●	●	●		●	●	●	614.3	675.84
				●	●	●	●	616.9	678.656
●				●	●	●	●	619.5	681.472
	●			●	●	●	●	622	684.288
●	●			●	●	●	●	624.6	687.1041
		●		●	●	●	●	627.1	689.92
●		●		●	●	●	●	629.7	692.736
	●	●		●	●	●	●	632.3	695.5521
●	●	●		●	●	●	●	634.8	698.368
			●	●	●	●	●	637.4	701.184
●			●	●	●	●	●	640	704.0001
	●		●	●	●	●	●	642.5	706.816
●	●		●	●	●	●	●	645.1	709.632
		●	●	●	●	●	●	647.6	712.4481
●		●	●	●	●	●	●	650.2	715.264
	●	●	●	●	●	●	●	652.8	718.08
●	●	●	●	●	●	●	●	655.3	720.896

SPECIFICATIONS

BANDWIDTH

20Hz to 20kHz +1/-2 dB

SIGNAL TO NOISE

90 dB

INPUT LEVELS

Low Gain (Level switch at +0 dBV)

Impedance: (100 K ohm)

Typical: 1V RMS

MAX: 6V RMS

MIN: 260mV RMS

High Gain (Level switch at -20 dBV)

Impedance: (50 K ohm)

Typical: 100 mV RMS

MAX: 1.1V RMS

MIN: 43mV RMS

OUTPUT LEVELS

Balanced Differential: 5V RMS maximum

Impedance: (600 ohms)

Single Ended: 2.5V RMS maximum

Impedance: (300 ohms)

DELAY LENGTH

2.56 milliseconds to 655 milliseconds in

2.56 millisecond steps

SAMPLE FREQUENCY

50 kHz

A/D

12 bits 2:1 companded

DISTORTION

Typically less than .08%

CONTROLS

Input Sensitivity

Output Level

Bypass

Delay Time Adjust

Input Gain Select

CONNECTORS

Input: Female XLR (Electronic Balanced)

¼" Phone RTS (Electronic Balanced)

Direct Output: Male XLR (Balanced)

Delay Output: Male XLR (Balanced)

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

CLASS B COMPUTING DEVICE: INFORMATION TO USER

This equipment generates and uses radio frequency energy and if not installed and used properly, that is, in accordance with the manufacturer's instructions, may cause interference to radio and television reception. It has been type tested and found to comply with the limits for a Class B computing device in accordance with the specifications in Subpart J of Part 15 of FCC Rules, which are designed to provide reasonable protection against such interference in a residential installation. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- reorient the receiving antenna
- relocate the equipment with respect to the receiver
- move the equipment away from the receiver
- plug the equipment into a different outlet so that the equipment and receiver are on different branch circuits.

If necessary, the user should consult the dealer or an experienced radio-television technician for additional suggestions. The user may find the following booklet prepared by the Federal Communications Commission helpful:

"How to Identify and Resolve Radio-TV Interference Problems"

This booklet is available from the U.S. Government Printing Office, Washington, DC 20402, Stock No. 004-000-00345-4.

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	92
4	95
3	97
2	100
1 1/2	102
1	105
1/2	110
1/4	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 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 LOUSPEAKER 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 SUCH APPLICATIONS. MEDIUM OR LIGHT ADHESIVE MARKING OR MAKER 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.

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