

Koss K/4DS Digital Delay System User Instructions

 **KOSS** CORPORATION

Precautionary Notes

The following safety and operating instructions **must** be read before operating the Koss K/4DS. These instructions should be retained for your future reference. For your safety, all warnings on the K/4DS and in the following operating instructions should be adhered to. To prevent electrical shock, do not remove the top cover or the bottom plate of this unit. There are no user serviceable parts inside. Refer servicing to Koss, or Koss authorized factory trained personnel. (See warranty for further details.)

- TO PREVENT FIRE OR ELECTRICAL SHOCK, DO NOT EXPOSE THIS UNIT TO RAIN OR MOISTURE, NOR USE NEAR WATER WITH WHICH THE UNIT MAY COME INTO CONTACT.
- TO INSURE ADEQUATE COOLING, DO NOT COVER THE TOP VENT HOLES AND MAINTAIN A MINIMUM AIR SPACE OF ONE INCH ABOVE AND ONE HALF INCH BELOW THE UNIT AT ALL TIMES.
- BEFORE CONNECTING OR DISCONNECTING THE K/4DS TO YOUR STEREO SYSTEM ALWAYS MAKE SURE THAT THIS UNIT AND YOUR RECEIVER OR AMPLIFIER POWER SWITCH IS IN THE "OFF" POSITION.
- THE KOSS K/4DS SHOULD BE CONNECTED TO A 120V 60 Hz POWER SOURCE ONLY.
- BEFORE INITIALLY TURNING ON THE K/4DS AND YOUR STEREO SYSTEM, BE SURE THE *DIMENSION* AND *GAIN SET* CONTROLS ARE TURNED FULLY COUNTERCLOCKWISE TO AVOID ACCIDENTAL HIGH ACOUSTIC LEVELS.
- TO GUARD AGAINST POSSIBLE RADIO FREQUENCY MODULATION, TRY TO AVOID PLACING THE K/4DS DIRECTLY NEXT TO, ON TOP OF OR UNDER YOUR RECEIVER, TUNER OR TELEVISION AND PREVENT PLACING ANTENNAS OR CABLES DIRECTLY ON TOP OF THE UNIT.

General

Before installing your Koss Digital Delay System, please take time to learn how the system works and how to maximize its performance.

The sound your conventional stereo cannot reproduce: During a live musical performance much of the sound does not travel a direct path to the listener. Most of the sound waves you hear are bounced or reflected repeatedly off the ceiling, walls and other obstructions. This reflected sound reaches you after the direct sound because of the extra distance it must travel. Due to the many reflecting surfaces, there are numerous sounds which are delayed and mixed as they reach the listener's ears. Engineers describe the summation of these delayed, reflected sounds as the "ambient sound field".

duce primarily the sound that would reach a listener over a direct path, so much of the sensation of a live performance is absent. Through sophisticated digital electronics, the Koss digital delay system *synthesizes* the "ambient sound field" from any existing record, tape or broadcast, whether it be mono or stereo, and reproduces it through a secondary set of loudspeakers placed at the side or rear of your listening room. The result is a spacious and lifelike reproduction of the original performance which is impossible to achieve with conventional stereo reproduction.

Conventional stereo systems cannot reproduce this ambient sound field. They repro-

Basically, the realism of a digitally delayed stereo system allows you, for the first time,

to acoustically adjust your listening room to the size of an intimate night club, a theater, concert hall or auditorium.

How the system works.

The Koss system contains a digital ambience synthesizer, a two-channel power amplifier, a wide-range two-channel stereophone amplifier and sophisticated switching circuitry.

The synthesizer unit processes the audio signals which are being sent to your main loudspeakers and uses the information to synthesize an ambient sound field similar to that which would be heard at a live performance. Use of the audio signals being sent to your main loudspeakers does not deteriorate or change any of your standard front channel information. The synthesized ambient audio signals are amplified by the internal two-channel amplifier and are intended to be played through a pair of secondary speakers of your choosing. (See the guide lines to follow.)

The synthesis of ambient signals is a complicated process. However, Koss gives you easy to use control over this process with the Environment and Dimension selectors on the Koss K/4DS. The environment selector determines the character of the synthesized sound. Use it to set the processor to the desired listening environment, whether it be an auditorium, concert hall, theater or a club. The dimension selector increases or decreases the apparent size of the environment you've chosen.

Use and Function of Koss K/4DS Controls

Environment control

The environment settings are preselected on the basis of both real world and mathematical models of typical acoustical environment. If you prefer listening to jazz in a club, use the club setting. If you've experienced rock in an auditorium, try the auditorium setting.

Each setting from the club (the smallest) to the auditorium, creates the acoustical environment of a progressively larger, more acoustically reflective environment. For example, the club setting represents a small, intimate club with 12 tables and a small performing area. Hence, the club setting features the shortest delay time. The auditorium, on the other hand, represents a large hall seating over 5,000 people with a long delay time. *Please Note:* You may notice a slight pop or click between the environment settings or when switching the K/4DS off or on. This is merely a shifting of the digital chip emphasis and is no reason for alarm.

Gain set control.

The gain set control regulates the amount of information you feed into the digital circuitry. This works very much like the input gain control you adjust when you're making a tape recording. **ADJUST THIS GAIN SET EACH TIME YOU CHANGE VOLUME LEVELS ON YOUR STEREO.** With your stereo playing at the volume you desire, turn the gain set control clockwise until the LED indicator lights up, (the LED indicates an overload condition), then turn down the gain set control until the LED light stops and only flickers during the most demanding passages. This is the ideal setting. *Please Note:* If you listen at relatively low volume levels, you may need to turn your gain set fully clockwise without the LED indicating any overload condition. This is not critical, as you have maximized the input to the digital circuitry.

Dimension control (Secondary Speaker Volume)

The loudspeaker dimension control allows the listener to increase or decrease the volume and ambience effect of his secondary speakers. This control is divided for individual volume balance control of the left or right ambient speakers.

After you've adjusted your gain set to the preferred listening level, turn the dimension control clockwise until you distinctly hear your secondary speakers, then turn the control down slightly to your listening level preference. *Note:* You should NOT BE ABLE to distinctly hear the ambient speakers, rather, they should provide a nondirectional ambience effect.

Loudspeaker Selector Switch

The loudspeaker selector switch provides three basic functions. In the Fourth dimension position, your two front stereo speakers will be switched on along with the secondary, ambience speakers you've added. In the stereo only position, you'll activate only the front channel speakers. This control provides an exciting difference when you switch from the fourth dimension after a few moments of listening, back into ordinary stereo only. Finally, the stereophones only position turns off all speakers to facilitate private listening. *Please Note:* The stereophone section is active in all these positions.

E. Q. Switch

The equalizer switch provides you with a bass boost in the lower bass frequency response area from 40 to 60 Hz and a clean low distortion roll off in the deep bass area below 40 Hz. *Note:* Depending on the efficiency and bass character of the loudspeakers you choose for ambience reproduction, you may need to boost the 40 to 60 Hz frequency response range. However, remember

that rotating the E.O. switch to the on position requires the K/4DS 15 watt amplifier to work double time and inefficient loudspeakers when used in these cases at high listening levels could drive the amplifier into distortion if it runs out of head room. The object of ambience synthesis systems is not to match sound pressure levels in each speaker (front and sides) but rather to accentuate a portion of the frequency response range which approximates the ambience sound fields in terms of delay, decay and reflectivity as well as generating natural sound pressure levels.

Stereophone controls

Based on research, Koss has provided exclusive circuitry for private enjoyment of the ambient sound field affects with stereophones. The Koss system's stereo headphone amplifier and stereophone environment and dimension controls also allow you to achieve a similar ambience experience with stereophones as you would when using the K/4DS with loudspeakers.

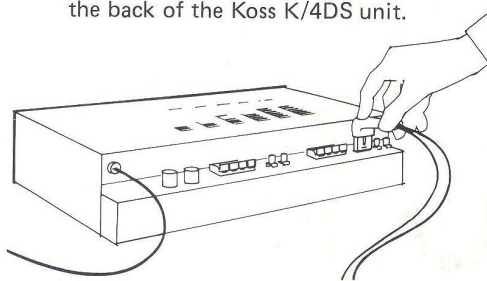
The stereophone comparator button was developed to enable you to momentarily go back into the stereo mode, for comparative purposes. *Note:* The stereophone comparator is a non-locking control so you must hold it in during your comparison.

Installation

You can use the outputs from either an amplifier, receiver or pre-amplifier to provide the input signals to the Koss K/4DS.

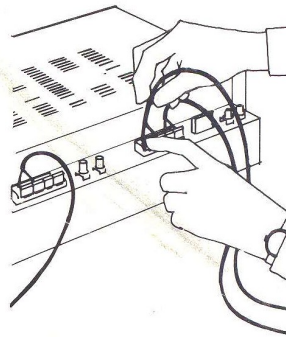
Using your amplifier or receiver as input

1. Connect the special cable provided to the connector labeled "Input A" on the back of the Koss K/4DS unit.



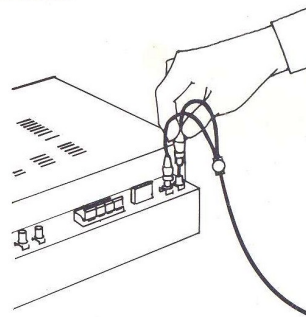
2. Connect the sleeve of the special cable to the speaker terminals on your amplifier. The wire with red sleeving goes to a right positive speaker terminal (usually red) on the amplifier and the black wire goes to the corresponding (negative) terminal (usually black). The wire with white sleeving goes to the left positive (+) speaker terminal on the amplifier and the black wire goes to the corresponding negative (-) terminal.
3. Connect your main loudspeaker leads to the speaker terminal labeled "To Front

Speakers" on the back of the Koss K/4DS. Take care to be sure each positive (+) terminal (usually red) on each speaker lead is connected to the red terminal on the appropriate channel of the K/4DS.



4. Connect the lead from the secondary speakers to the terminals labeled "To Rear Speakers" on the back of the Koss K/4DS. Use the same procedure as in number 3 above.

Or using your preamplifier as input you should:



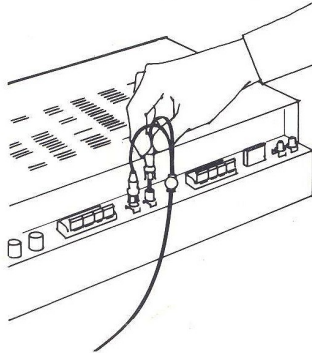
1. Purchase and connect an RCA-type audio cable to each of the two terminals marked "Input B" on the back of the Koss K/4DS.
2. Plug the other end of each cable into the corresponding amplifier output jacks on your pre-amplifier. (Y-connectors may be required to provide input to both the K/4DS and your front channel power amplifier.)
3. The leads from the secondary speakers are connected to the terminals marked "To Rear Speakers" on the back of the Koss K/4DS, as in number 4 above.

Using an external amplifier.

The two-channel power amplifier inside the Koss K/4DS has a capacity of 20 watts per channel into 4 ohms. (15 watts into 8 ohms.) If you feel you need more power you may connect a large auxiliary amplifier to the system.

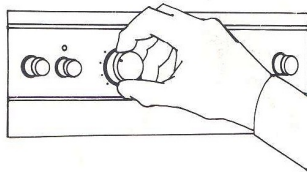
Please Note: As opposed to stereo speakers where louder is better, the ambient speaker of a digital delay system supplies only presence and reality. Additional power is not a requirement, unless either: A) you have comparatively inefficient speakers or B)

your stereo amplifier has more than 150 watts of power and your room size or speaker system requires you to use all of this power. In either event, you may:



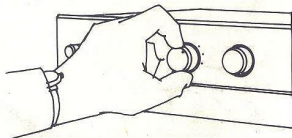
1. Connect an RCA-type audio cable to each of the two terminals labeled "To EXT Rear Amp" on the back of the K/4DS.
2. Plug the other end of each cable into the corresponding input terminal in your auxiliary amplifier.
3. Connect the secondary speaker leads to the speaker output terminals on your auxiliary amplifier.

How to use the system with loudspeakers



After installation, start with the E. Q. control in the "Off" position. The Gain Set should be fully counterclockwise, Environment should be set for auditorium, Selector should be in the STEREO ONLY mode, the Dimension should be fully counterclockwise. The Level and Dimension settings and comparator button on the right side of the unit are for stereophone control only and will be addressed later.

1. Set the controls as outlined above.
2. Turn on your stereo.
3. Turn on the Koss K/4DS by depressing the power button.
4. With loudspeakers SELECTOR set in the "STEREO ONLY" mode, adjust the volume of the front speakers to the desired level.
5. Now adjust the gain set until you see it flicker during only the loudest peak passages of the recording.



6. After your front channel volume has been adjusted, and your gain set has

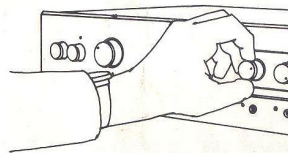
been completed, rotate the selector switch to the 4th dimension to pass synthesized signals to the ambient speakers.

7. Slowly raise the loudspeaker dimension control to achieve the ambience sound level you desire. (Remember: Ambient sound is very subtle. If you are very aware of the secondary loudspeakers you may have an unnatural type sound.) Turn the loudspeaker dimension up until you are barely aware of the secondary loudspeakers, then back off slightly.
8. Now you're free to choose any environment you wish, from an auditorium to a small club. You can demonstrate the dramatic effects of the Koss K/4DS by briefly rotating the loudspeaker selector back to the "STEREO ONLY" position. We suggest you switch into "STEREO ONLY" after a few minutes of listening to the 4th dimension sound of Koss. When the ambience is removed from your listening room, you'll know why the Koss Digital Delay System is the next step beyond stereo.

With stereophones

CAUTION: To avoid any power surge, turn the stereophone level control counterclockwise to the lowest setting before plugging in your stereophone.

1. Plug your stereophones into one of the two jacks on the K/4DS. (The Koss system provides wide range drive capability for two pairs of stereophones.)
2. Set loudspeakers *Selector* to "PHONES ONLY" position if you only wish to listen to stereophones.
3. Adjust *Environment* selector from small club to an auditorium just as you would if you were going to listen through your loudspeakers.
4. Adjust the *Stereophone Level* control for the desired volume.



5. Adjust the *Stereophones Dimension* controls to the desired level of ambience sound field effects. (The fully counterclockwise position eliminates the digital delay and allows you to listen in STEREO ONLY.)
6. Now feel free to choose any environment you wish, from auditorium to theater, concert hall or club.

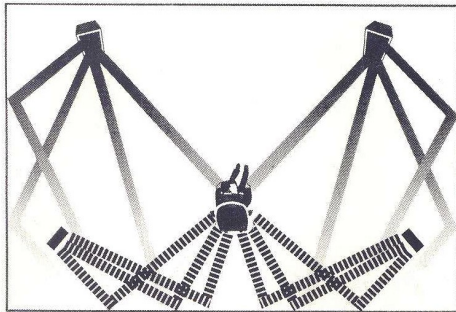
To quickly hear the effects of removing the synthesized ambient information from your stereophones, simply depress and hold the *non-locking* Comparator Button. Release

the button and you're automatically back to 4th dimension of the Sound of Koss. Note: The input gain set is as important with stereophones as speakers, always be sure your system is properly calibrated.

Choosing Secondary Speakers

Musical content of reflected sound is primarily in the response range below 8,000 Hz. The reason for this phenomenon is that high frequency sounds are broken up and absorbed much more rapidly than low frequency sound. A digital delay purchaser will recognize this as a benefit since the additional expense of a second set of full range loudspeakers is not necessary. Instead, Koss recommends that you purchase a speaker which:

1. Is efficient and does not require a lot of power
2. Accurately handles the frequency response range from 200 to 8,000 Hz (Cycles)
3. Is inexpensive
4. And is small and therefore easily positioned in your listening room for optimum effect.



Koss recommends that you place your secondary loudspeakers at the sides or the back of your listening room for the proper ambience effect. Koss also recommends that the ambience speakers are not directly facing the listener, but rather positioned to reflect off the walls and/or ceiling.

A.M. — F.M., Mono and Stereo Broadcasts

The excitement of a digital delay system can be enjoyed on stereo or monaural recordings as well as A.M. and F.M. Broadcasts. Please note however, that strong A.M. and F.M. reception is necessary. Distant or weak stations cannot be used effectively.

Improving Signal Strength

You probably have quite an investment in your hi fi system. Studies show that even though you've purchased add on components for your stereo system amounting to

hundreds of dollars, you're probably using a 99 cent F.M. dipole antenna which came with your receiver. If this is the case, Koss recommends the use of coaxial antenna cable and an external antenna hookup. The cost of this add on is very low. Usually \$20 to \$30, and is definitely a worthwhile investment.

The Sound of Digitally Delayed Ambient Channel Information

The Koss K/4DS Digital Delay System is equipped with some of the most sophisticated circuitry available today.

Features such as cross feed circuitry, random access memory and predetermined volume differences (amplitude) create an ambient channel sound which, if listened to without its stereo front channel counterpart, sounds like a complex, multi-dimensional, omnidirectional, almost garbled mixture of sounds.

(The phenomenon most closely associated with this, although never heard by the human ear, is to hear only the ambient reflected sounds in an auditorium, concert hall, theater or club, WITHOUT HEARING THE DIRECT SOUND OF THE ACTUAL PERFORMANCE!)

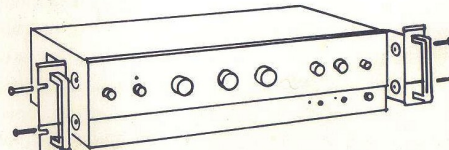
The Sound of Digitally Delayed Voices

The effect of an announcer's voice in a barrel becomes more pronounced as you move from the club to the auditorium setting. In addition, the more ambience you supply by increasing the dimension level in the secondary speakers, the more pronounced this "barrel" effect becomes.

The Koss K/4DS does not enhance this effect in any way, it does however give the announcer's voice the same amount of ambience that you're restoring to your music. Koss recommends that you set the environment and dimension control to the level of your choice when listening to an announcer to best optimize your system.

Optional rack mounting kit

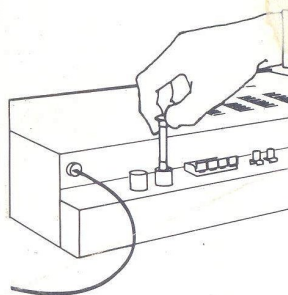
A rack mounting kit is available as an option for the Koss K/4DS. It can be purchased at most Koss dealers and can be installed in minutes using a philips head screwdriver. These units may be purchased from your local dealer or directly from the Koss Customer Service Department. Simply mail a check for \$19.95 to Koss Corporation c/o Virginia Lamm.



Service Information

The Koss K/4DS contains no user serviceable parts. Do not remove the cover of the unit. Refer servicing to factory trained personnel. Units requiring service should be returned, prepaid, to the Koss Corporation, 4129 N. Port Washington Avenue, Milwaukee, WI 53212.

The two speaker fuses can be removed simply by turning the fuse holder counterclockwise. Use only two one half amp normal blow fuses. Using any other size fuses voids your warranty. Also, care should be taken when connecting your ambience speakers.



Poor connection often results in a blown speaker fuse in the K/4DS. If you have a problem in operating the K/4DS be sure to check your fuses before contacting Koss.

ONE (1) YEAR LIMITED WARRANTY

Koss Corporation warrants this product to be free from defects in workmanship and/or materials for a period of one (1) year from the date of purchase. Koss agrees to remedy such defects by repairing or replacing, at its option, any product provided the defective equipment is sent prepaid to Koss Corporation, 4129 North Port Washington Avenue, Milwaukee, Wisconsin 53212.

This warranty applies only to the original consumer purchase. It does not extend to damage caused by misuse, neglect, accident, incorrect wiring not our own, improper installation, unauthorized modification, or to use in violation of instructions furnished by us.

THE DURATION OF ANY IMPLIED WARRANTY GRANTED BY STATE LAW, INCLUDING BUT NOT LIMITED TO ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, SHALL BE LIMITED TO THE PERIOD OF ONE (1) YEAR FROM THE DATE OF PURCHASE. Some states do not allow limitations on how long an implied warranty lasts, so this limitation may not apply to you.

KOSS CORPORATION SHALL NOT BE LIABLE FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES IN EXCESS OF THE PURCHASE PRICE OF THE EQUIPMENT, WHETHER AS A RESULT OF BREACH OF CONTRACT OR WARRANTY OR ALLEGED NEGLIGENCE. Some states do not allow the exclusion or limitation of consequential damages, so the above limitation or exclusion may not apply to you.

This warranty gives you specific legal rights, and you may also have other rights which vary from state to state.

hearing is believing

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