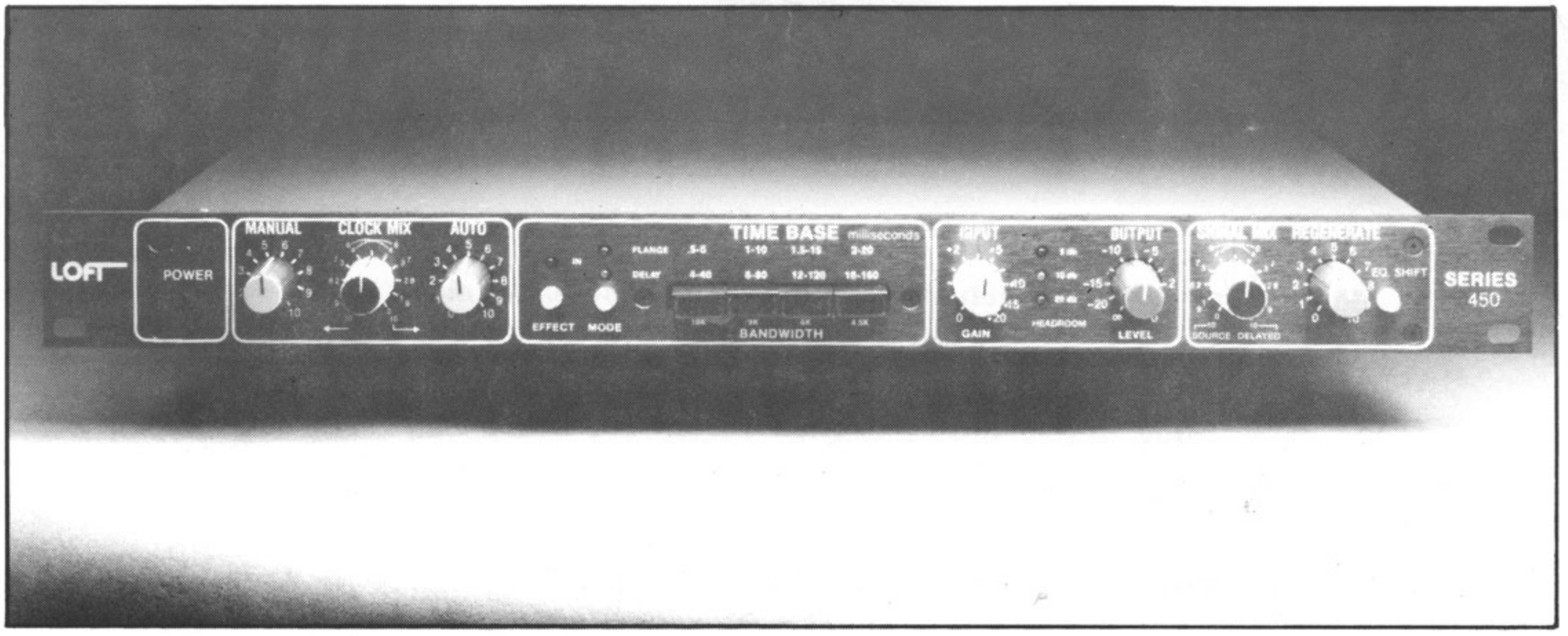


LOFT professional audio products

MODEL 450
DELAY LINE/FLANGER

OWNERS MANUAL

TABLE OF CONTENTS

I. DESCRIPTION

The Series 450 Delay Line/Flanger is designed for the professional recording engineer and musician. Like its predecessor the Series 440, this unit offers you flanging, doubling, chorus and Leslie effects that are second to none. The optional EM450 extender module doubles the delay time of each range giving you a full 320ms of delay for longer delay effects.

FEATURES

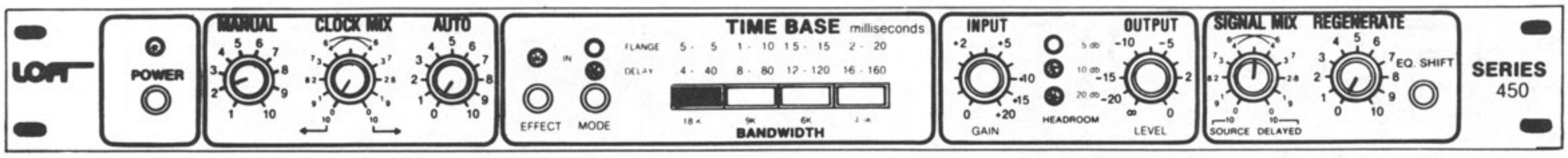
- SEPERATE INPUT/OUTPUT LEVEL CONTROLS
- 20 db OF GAIN FOR USE WITH MUSICAL INSTRUMENTS
- 10:1 DELAY RANGE WITH IN TIME BASE
- REGENERATION EQ SHIFT
- 3 LED HEADROOM INDICATOR
- REMOTE IN/OUT SWITCH
- FLEXABLE OSCILLATOR SWEEP CONTROLS
- B.T.A. INPUT
- OUTPUT WILL DRIVE +18dbm INTO 600 ohm LOADS
- INVERTED CONTROL VOLTAGES
- DELAY EXTENDABLE TO 320ms W/OPTIONAL EM 450 DELAY EXTENDER
- FOOT PEDAL INTERFACE FOR REMOTE DELAY TIME CONTROL
- 1/4" PHONE & 3 PIN XLR CONNECTORS ON INPUTS/OUTPUTS

II. THEORY OF OPERATION

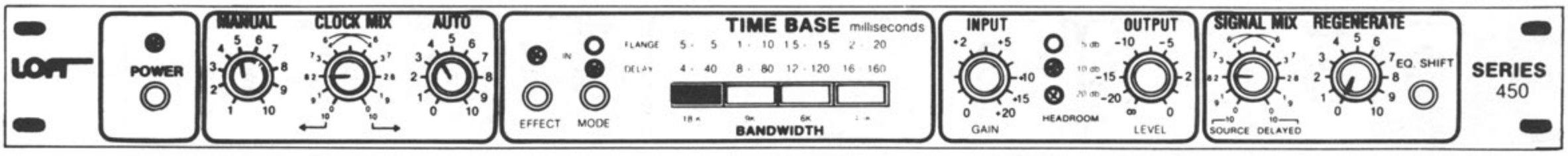
To create time-delay, an audio signal is read into a memory, stored for some period of time and then read out again. The major difference between different dealy lines is how the signal is stored. In the LOFT Model 450 the signal is stored in an Analog Shift Register. The Analog Shift Register consists of many stages, each capable of storing a discrete analog voltage. Every time the clock waveform toggles, the voltage that was present at the input is read into the first stage. The discrete voltage sample that was resident in the first stage is shifted to the second, the second sample to the third and so on until the last stage where the sample is shifted out. Since the clock frequency that is shifting these samples through the register is several times faster than the waveform being reproduced the output will look like a stairstep replica of the input waveform only delayed in time by however long it took to step through the shift register. Since each sample resided in each register stage for one whole clock period, the total delay is a simple function of the clock frequency and the number of register stages. (N stages/F clock frequency = Delay) The various delay effects are created by varying the clock frequency which in turn varies the delay time. This delayed signa is then mixed with the undelayed signal. Reverberation and resonant effects can be created by reintroducing the delayed output back at the input and delaying it over and over again.

III. INSTALLATION AND HOOK-UP

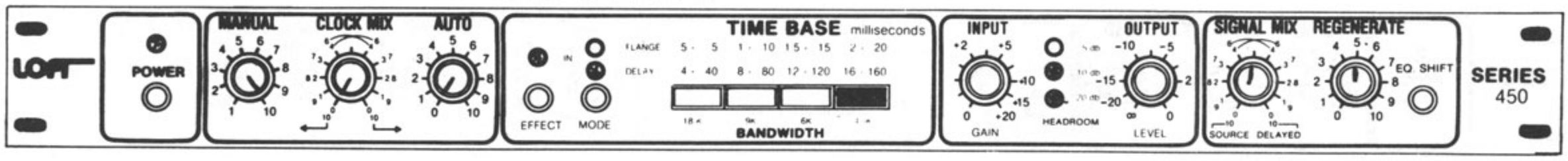
CHORUS EFFECT (NO PITCH CHANGE)



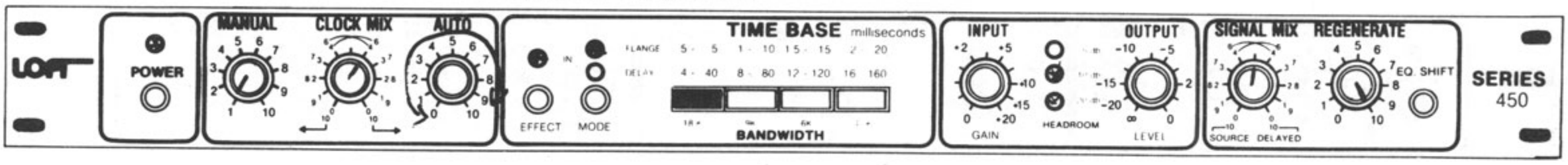
CHORUS EFFECT (WITH PITCH CHANGE)



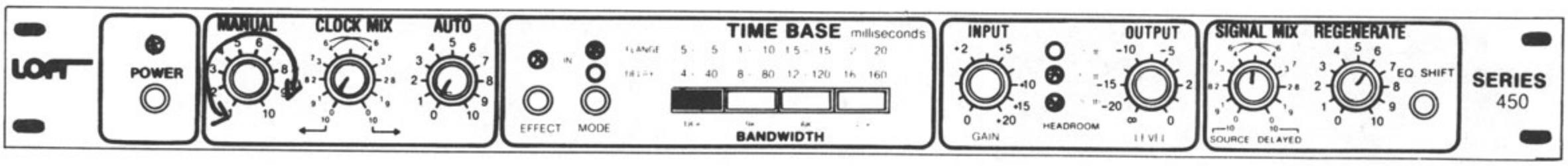
LONG DELAY



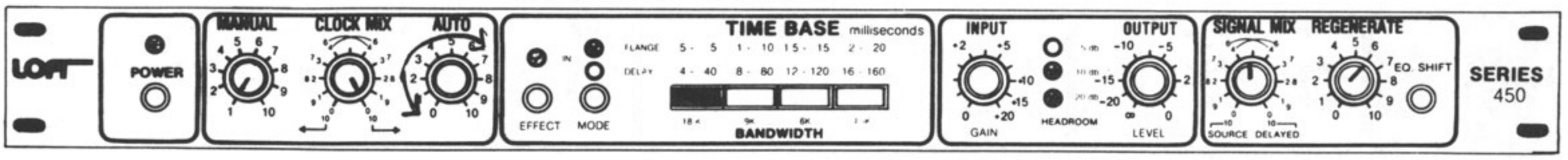
AUTO FLANGE



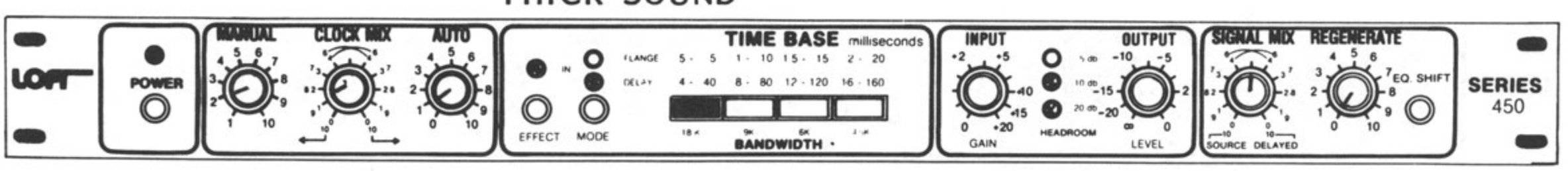
MANUAL FLANGE



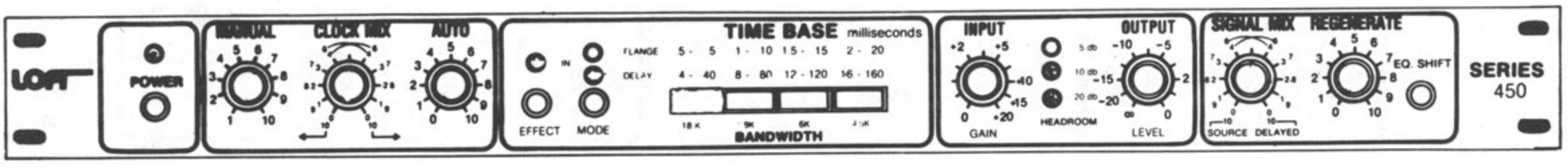
RESONANT FLANGE

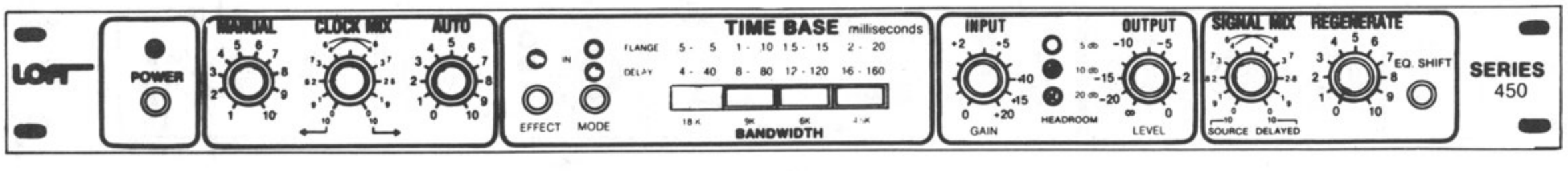


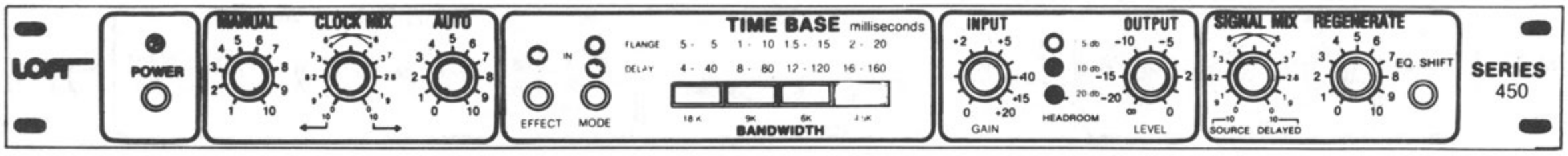
THICK SOUND

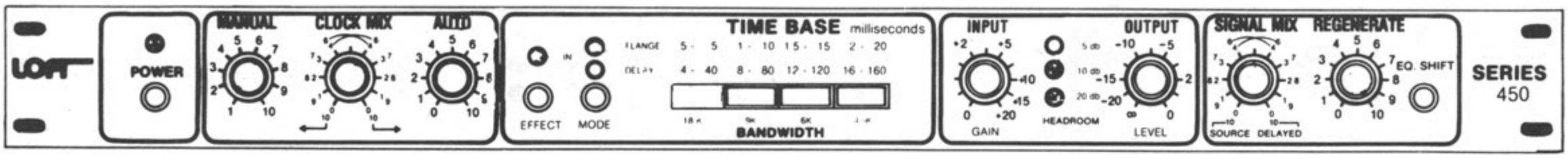


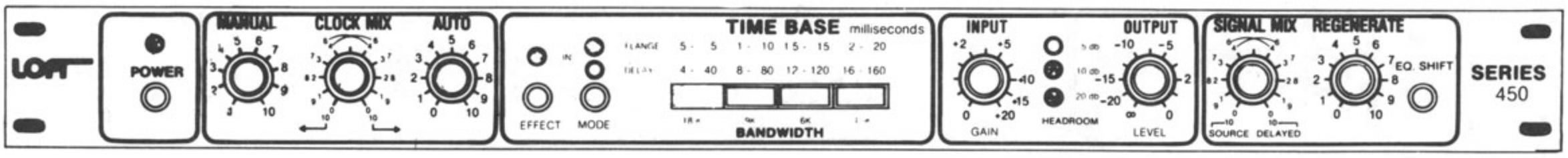
III. INSTALLATION AND HOOK-UP

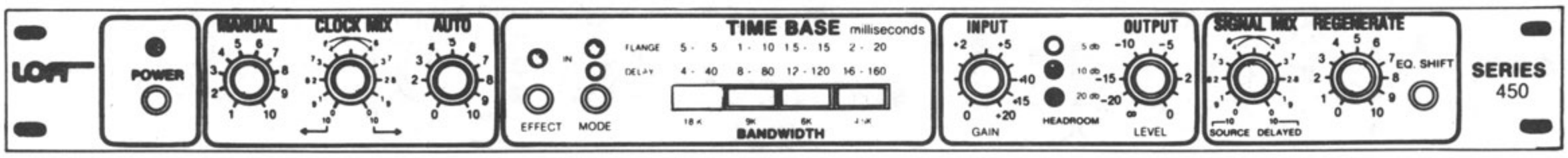


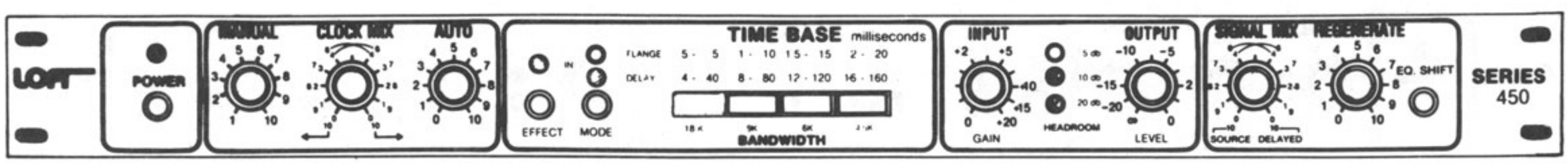




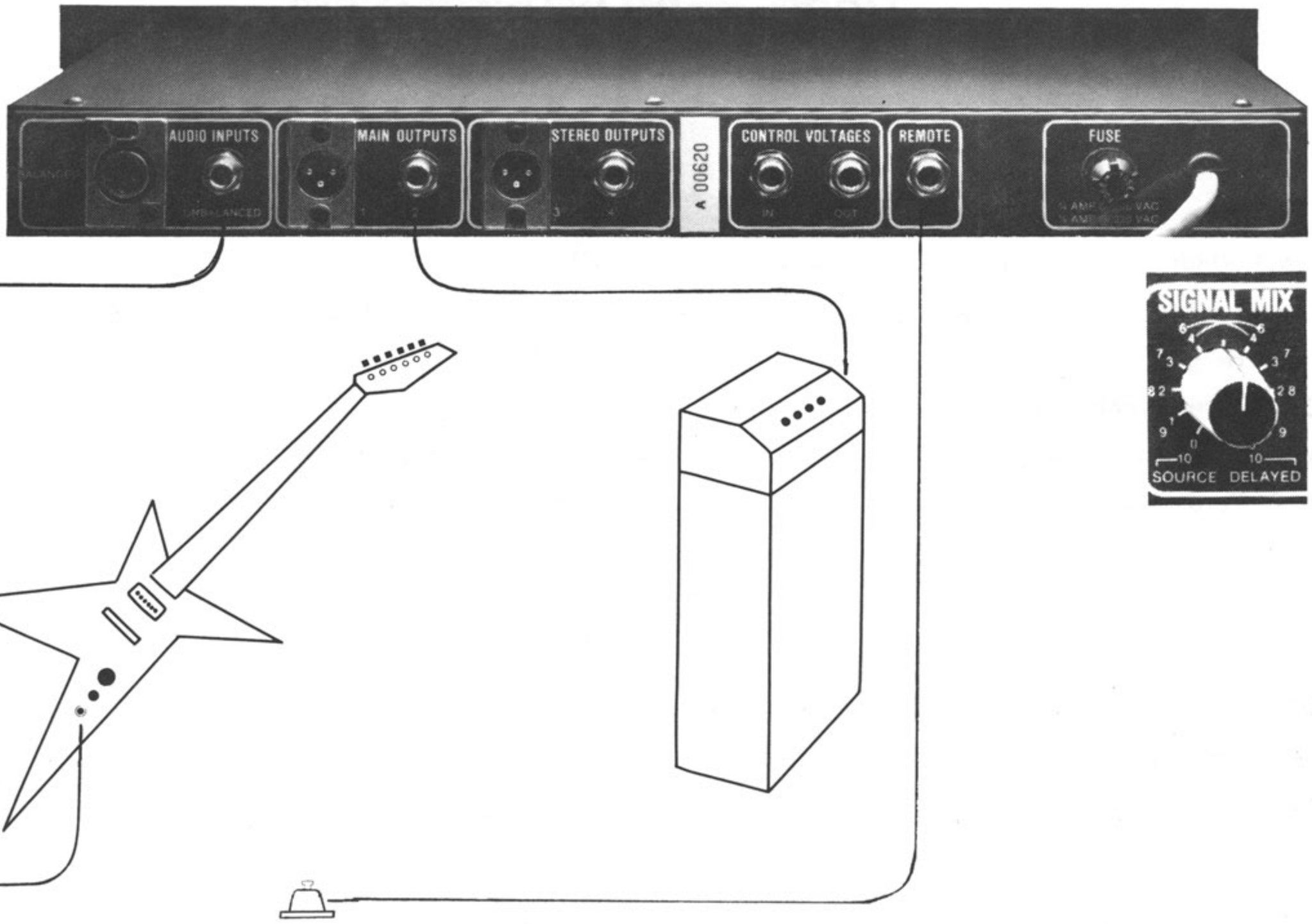


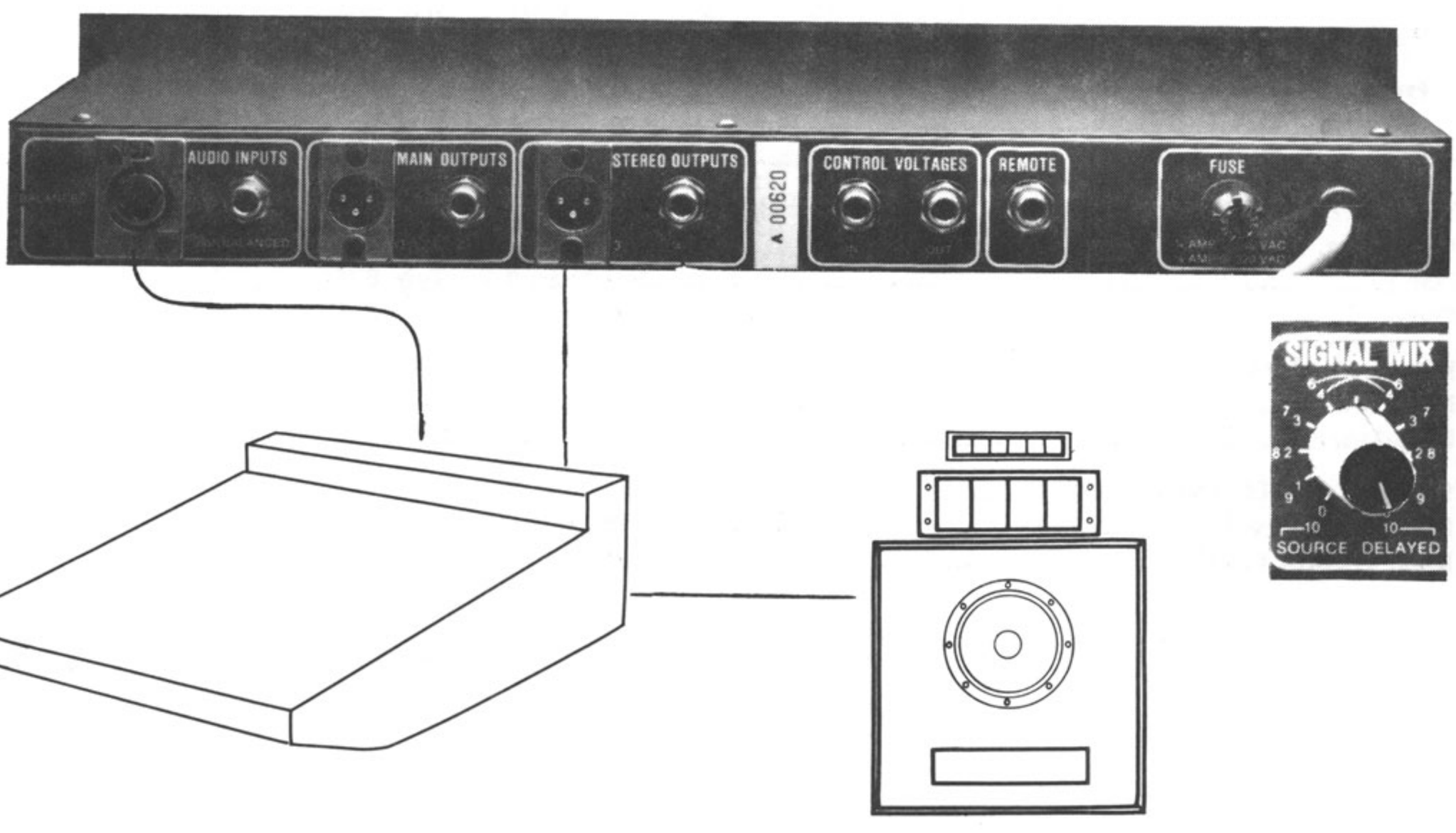






STANDARD CONNECTIONS





MODEL 450 DELAY LINE/FLANGER

SPECIFICATIONS

MECHANICAL

Panel Width .....19"

Chassis Width .....17"

Panel Height .....1-3/4"

Chassis Depth Behind Panel.....9"

Weight .....net 7 lbs., shipping 9 lbs.

A. C. Cord .....3 wire grounded

Connectors .....XLR and ¼"

ELECTRICAL

DELAY TIME (continuously variable within each range)

			with EM-450
18K BANDWIDTH (± 3dB)			
MODE	Flange	.5-5ms.	.5-5ms.
	Delay	4-40ms.	8-80ms
9K BANDWIDTH (±3dB)			
MODE	Flange	1-10ms.	1-10ms.
	Delay	8-80ms.	16-160ms.
6K BANDWIDTH (±3dB)			
MODE	Flange	1.5-15ms.	1.5-15ms.
	Delay	12-120ms.	12-120ms.
4.5K BANDWIDTH (±3dB)			
MODE	Flange	2-20ms.	2-20ms.
	Delay	16-160ms.	32-320ms.

Regeneration (feedback).....variable from 0 to 100%

Frequency Response

Delayed Only.....see "DELAY TIME"

Direct Only .....20hz. to 20khz. +0 -1dB

TOTAL HARMONIC DISTORTION + N. (delayed signal only)
(ref. 1Khz. @ +10dbm)

Flange.....less than 0.5% Typ. 0.2%

Delayed.....less than 1.0% Typ. 0.8%

INPUT IMPEDANCE

Balanced .....greater than 20K

Unbalanced .....greater than 47K

OUTPUT IMPEDANCE .....10 ohms

Max. Input Level .....+18dBm

Max. Output Level .....+dBm

IV. OPERATING PROCEDURES

FRONT PANEL

1. POWER SWITCH

This switch turns unit on. LED above switch lights when unit is on.

2. MANUAL

Manual control varies clock frequency which in turn varies the delay of the selected time base from minimum (1) to maximum (10).

3. CLOCK MIX

The clock mix controls the depth of the automatic sweep. When panned full counter clockwise, the delay time is controlled completely by the manual control. When panned full clockwise, the delay time sweeps over full range. When panned to any intermediate setting, the clock will be controlled by both the manual and auto controls. As the clock mix control is panned away from auto, the depth of auto sweep is diminished.

4. AUTO

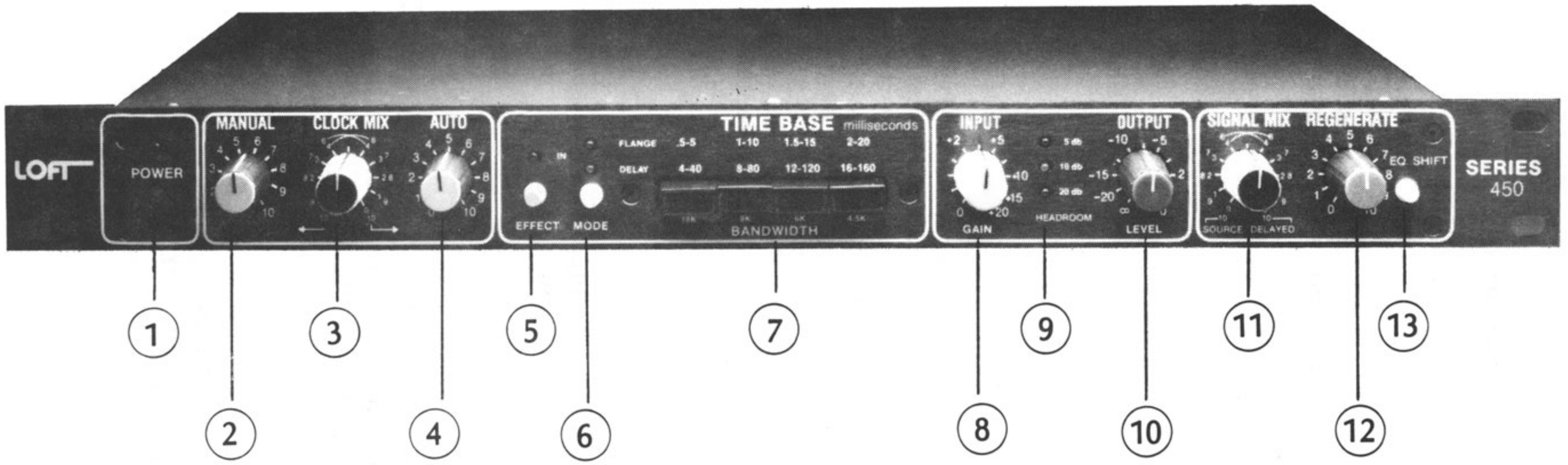
The automatic control varies the rate of the automatic sweep generator from slow (1) to fast (10).

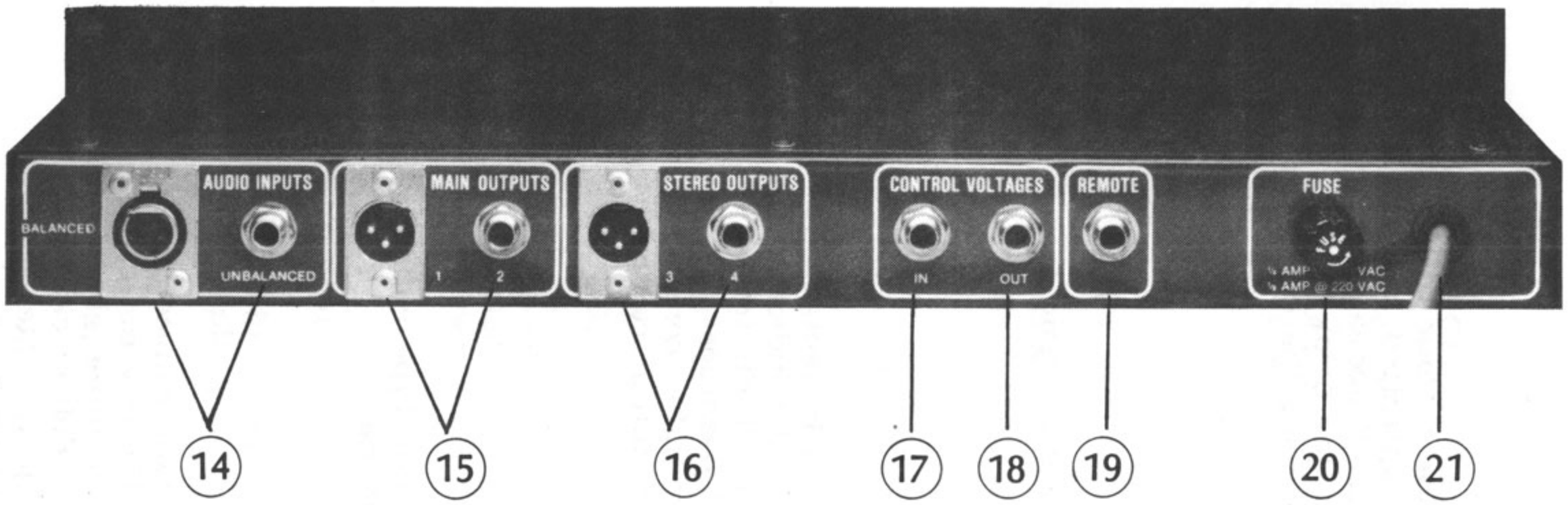
5. EFFECT SWITCH

This switch activates FET circuitry which disengages all effects passing input signal unmodified. LED above lights when effects are engaged.

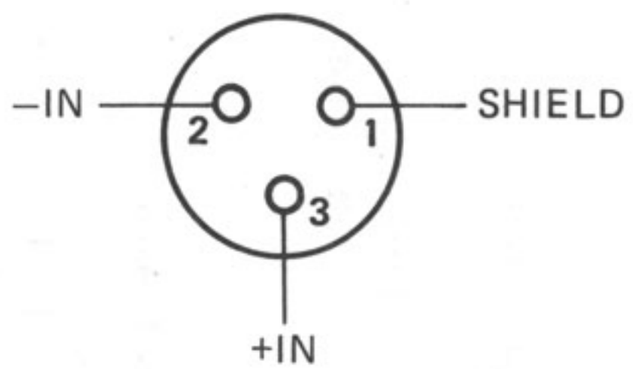
6. MODE SWITCH

This switch selects between flange or delay mode. Flange mode is indicated by an amber LED. Delay mode is indicated by green LED.


LOFT
POWER
MANUAL
CLOCK MIX
AUTO
TIME BASE
milliseconds
FLANGE
DELAY
.5-5
1-10
1.5-15
2-20
4-40
8-80
12-120
16-160
IN
EFFECT
MODE
BANDWIDTH
INPUT
GAIN
HEADROOM
OUTPUT
LEVEL
SIGNAL MIX
REGENERATE
EQ SHIFT
SOURCE
DELAYED
SERIES
450
1
2
3
4
5
6
7
8
9
10
11
12
13



BAL. INPUT



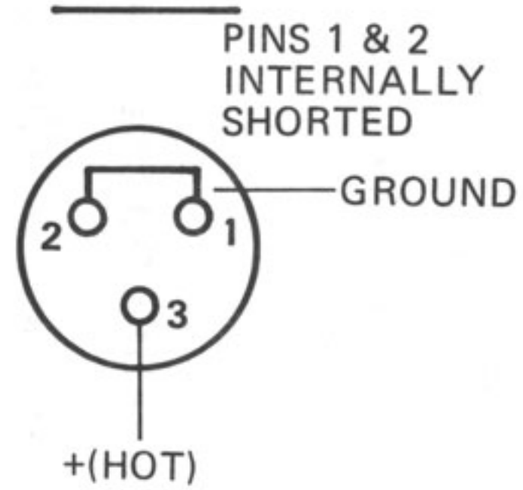
PLEASE NOTE:

XLR'S ARE WIRED FOR PROFESSIONAL LINE LEVER EQUIPMENT USING PIN 3 AS + IN.

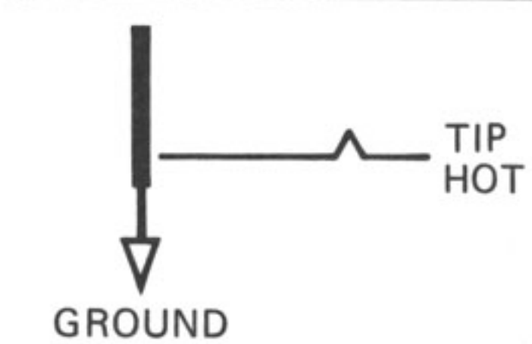
MICROPHONE CABLES ARE WIRED WITH PIN 2 AS THE + IN.

CABLES WIRED FOR MICROPHONES CANNOT BE USED WITH THE XLR OUTPUTS OF THIS UNIT.

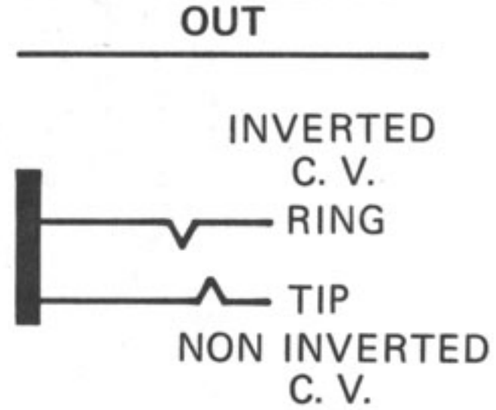
OUTPUTS



ALL ¼" INPUT & OUTPUTS



CONTROL VOLTAGE OUT



USING A MONO JACK WILL PROVIDE A NON INVERTED OUTPUT.

IV. OPERATING PROCEDURES

FRONT PANEL - Continued

7. TIME BASE

The time base switches select between four different delay ranges with the bandwidth optimized for each range. The delay range is indicated above each selector. The bandwidth is indicated below each selector. The clock controls will vary the delay times within the selected range.

8. INPUT GAIN

The input gain control varies the input gain from 0 db to +20 db.

9. LED HEADROOM INDICATORS

The headroom indicators provide an instantaneous visual display of peak headroom. The indicator LED's are callibrated to turn on at 20 db (green), 10 db (amber) and 5 db (red) of headroom before clipping. If 5 db (red) indicator lights constantly, input gain should be reduced and output control increased.

10. OUTPUT CONTROL

Output level control is an attenuator type volume control. Maximum output is unity gain.

11. SIGNAL MIX

The signal mix control is a "constant volume" pan which acts as a balance between the dry direct source and delayed signals. Full counter clockwise produces 100% dry source signal. Full clockwise rotation produces 100% delayed signal. Intermediate settings are a proportionate mix of both signals.

IV. OPERATING PROCEDURES

FRONT PANEL - Continued

12. REGENERATION

The regeneration control regulates the amount of delayed signal that is reintroduced to the input of the delay line for re-delay. Full clockwise rotation commands maximum regeneration, counter clockwise provides no regeneration.

13. E.Q. SHIFT

The E.Q. Shift alters the frequency spectra of regenerated signal.

REAR PANEL

14. AUDIO INPUT

Balanced - XLR jack accepts balanced input. This input is electronically balanced.

Unbalanced - 1/4" phone type jack accepts unbalanced inputs, such as musical instruments, direct outs, and effects sends.

15. MAIN OUTPUT

Main output is for use when direct connection to amplifiers or recorders is desired.

16. STEREO OUTPUT

Stereo output is for use when generating pseudo stereo or for interfacing into an effects loop.

IV. OPERATING PROCEDURES

REAR PANEL - Continued

17. CONTROL VOLTAGE IN

The control voltage in is used for external control of delay time. A control voltage from 1-11 volts will vary the delay time from longest to shortest. Patching into this input will disable front panel delay controls. The control voltage can be controlled with the optional FP450 foot pedal or other external voltage sources.

18. CONTROL VOLTAGE OUT

The control voltage out is used to slave two or more 450 Delay Line/Flanges together. This output accepts a stereo 1/4" plug. When the slave unit is driven by the tip voltage, the two 450's will track. When the slave unit is driven by the ring voltage, the delay function of the slave unit is inverted with respect to the master. i.e. When master unit is commanding minimal delay, slave unit delivers maximum delay. This connection is used for creating harmonizing effects.

19. REMOTE

Remote allows remote control of effects in/out. Front panel effect in/out switch must be in "in" position.

20. FUSE

Fuse should be replaced with same value fuse as indicated on rear of unit.

21. AC CORD

This is a standard 3 wire grounded cord and should always be connected to the proper AC source. (115 Volts, 60 or 50 Hz)

LOFT FACTORY SERVICE

Should service be required, please follow the instructions below and return freight prepaid to:

PHOENIX AUDIO LABORATORY, INC.
Service Department
91 Elm Street
Manchester, Connecticut 06040

USE LOFT ORIGINAL CARTON

Save all packing materials. Using original carton and packing will result in safe and reliable transportation. Be sure unit does not move around in shipping. Phoenix cannot be responsible for units improperly packed. Send only the unit.

IF THERE ARE ANY QUESTIONS, NOTIFY THE LOFT SERVICE DEPARTMENT FOR ASSISTNACE.

TWO YEAR LIMITED WARRANTY

LOFT PROFESSIONAL PRODUCTS (LOFT), MANUFACTURED BY PHOENIX AUDIO LABORATORY, INC. (PHOENIX), ARE WARRANTEED TO BE FREE OF DEFECTS IN MATERIAL AND WORKMANSHIP FOR A PERIOD OF TWO (2) YEARS ACCORDING TO THE FOLLOWING CONDITIONS AND EXCEPTIONS:

I. PURCHASE REGISTRATION:

A. Unit must be purchased from an authorized LOFT dealer.

B. Purchase registration card must be filled out in full and mailed to:

PHOENIX AUDIO LABORATORY, INC.
91 Elm Street
Manchester, Connecticut 06040

C. Purchase registration card must be mailed within Fourteen (14) days of purchase.

II. WARRANTY IS VOID IF UPON FACTORY EXAMINATION IT IS DETERMINED THAT:

A. Unit has been misused or abused.

B. Unit's serial number has been removed or defaced.

C. Unit has been subjected to unauthorized modifications or alterations.

III. OBTAINING SERVICE:

A. Ship the defective item to:

PHOENIX AUDIO LABORATORY, INC.
91 Elm Street
Manchester, Connecticut 06040

B. Transportation charges to the factory are the responsibility of the owner.

C. Warranty does not include cleaning and normal maintenance.

IV. PHOENIX SHALL NOT BE LIABLE FOR ANY INCIDENTAL OR CONSEQUENTIAL DAMAGES RESULTING FROM BREACH OF WARRANTY OTHER THAN REPAIR OR REPLACEMENT OF THE LOFT PRODUCT, AT THE SOLE DISCRETION OF PHOENIX.

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