

Kustom[®]



OWNER'S MANUAL



LEAD AMPLIFIER

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P/N 006-0075-00

KUSTOM WARRANTY

All Kustom amplifiers, power units, mixers, and their associated components and parts, except as specified below, are guaranteed, by Kustom Electronics, Inc., to the original purchaser to be free of defects in material or workmanship for a period of five (5) years from the date of purchase.

— and —

All Kustom speaker cabinets and their associated components and parts, except as specified below, are guaranteed, by Kustom Electronics, Inc., to the original purchaser to be free of any defects in materials and workmanship for a period of one (1) year from the date of purchase.

— provided —

- (1) The original purchaser applies for a Kustom Warranty Card for the guaranteed product(s) within 10 days of the date of purchase; and,
- (2) Within the applicable period of this guarantee, the original purchaser delivers, at his own expense, the defective product(s) to an Authorized Kustom Dealer or Service Center for repair; or, where no such dealer or service center is nearby, obtains at his own expense from Kustom Electronics, Inc., an "Authorization Number" to return merchandise and ships, at his own expense, the defective product(s) to Kustom Electronics Customer Service, 909 W. Cherry, Chanute, Kansas 66720. The repaired product(s) will be returned freight prepaid.

Kustom Electronics, Inc., will, at its option, repair or replace the defective part(s) or product(s).

Excluded from coverage by this warranty are exterior surfaces and finishes, face panels, grill cloth, covers, knobs, handles, casters and appearance items.

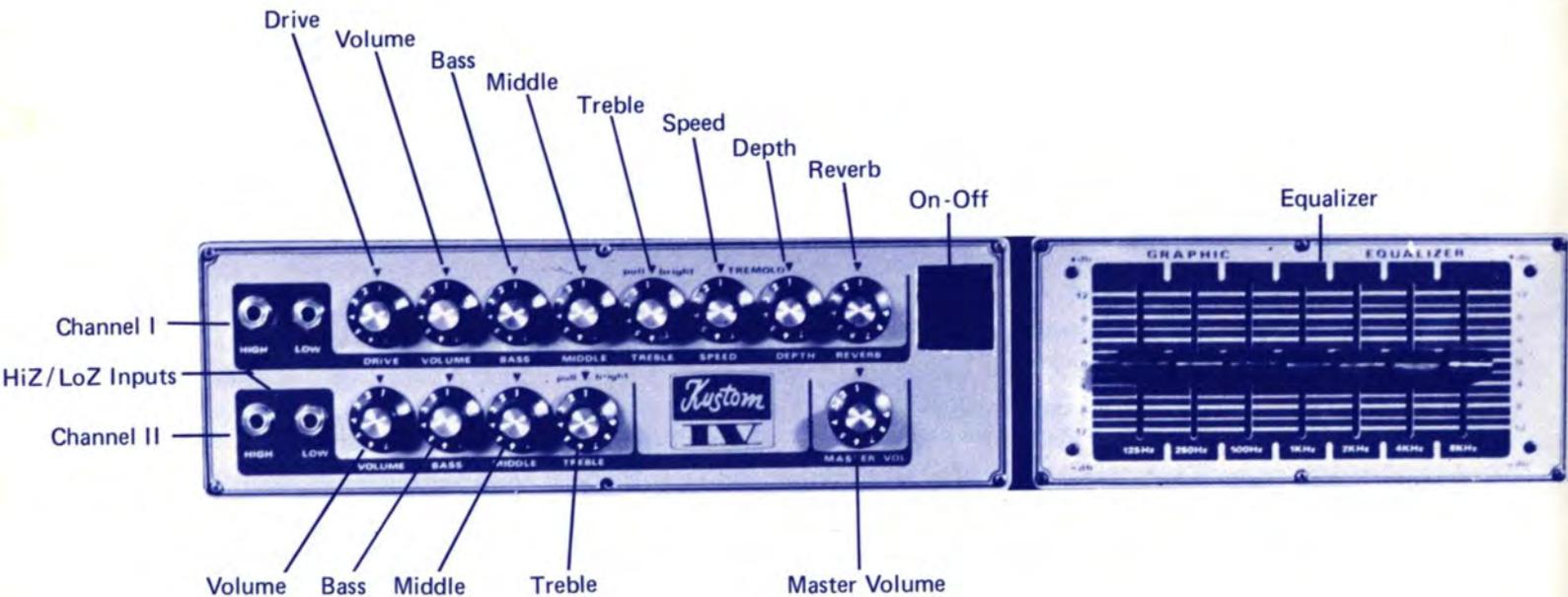
Any modification of the Kustom-manufactured product(s) such as the installation of substitute parts, rewiring or other changes to the system without written authorization from Kustom Electronics, Inc., will automatically void this warranty.

Kustom Electronics, Inc., shall not be liable for any direct, special, incidental or consequential damages incurred by reason of a breach of the above provisions, except as expressly provided above.

The provisions of this warranty shall be covered by the local laws of the state where the original purchaser shall purchase products covered hereby, and shall be enforceable only to the extent, and in the manner, permitted under such laws.

EXCEPT AS HEREIN EXPRESSLY PROVIDED, KUSTOM ELECTRONICS, INC., MAKES NO WARRANTY, EXPRESSED OR IMPLIED, OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, OR OTHERWISE.

KUSTOM IV LEAD



CONTROL OPERATION

CHANNEL I – LEAD

The Kustom IV Lead electric guitar amplifier is designed with one of the most flexible electronic control systems available.

The Channel I preamplifier includes a non-linear device which can be used to introduce a deliberate, controlled distortion into the music. Located in the circuit between the DRIVE and VOLUME controls, the device receives its signal from the DRIVE circuit. In this manner, a high DRIVE setting causes more distortion, independent of the VOLUME setting. As a result, the VOLUME setting to produce a given output will depend on the DRIVE control setting. DRIVE and VOLUME controls should be used together to obtain a type of distortion similar to certain older tube-type amplifiers. To achieve this sound, adjust both controls so that the desired amount of distortion is achieved at the required volume level. With the DRIVE control adjusted maximum counter-clockwise, distortion will be at a minimum.

Distortion occurs in the preamplifier and not in the output or final stages. Output distortion will be obtained only at high power and volume levels and has a distinctly different sound.

The BASS, MIDDLE, and TREBLE controls are of the "boost and cut" configuration, and exhibit a great deal of control over their operating ranges. However, the type of guitar, strings, and playing style will have a noticeable effect on the tone control operation. The electric guitar has a frequency range of from approximately 74Hz (open low E) to 1320Hz (12th fret high E). The dominant harmonic overtones occur in the frequency range of 128Hz - 5280Hz. The relationship between the fundamental frequency and the harmonics determine the tonal quality of the amplified sound. The tone control circuitry provides the musician with the means to control the amplitude relationship between these frequencies.

The tone control circuits are configured very much like those used on the older tube-type amplifiers. This arrangement has the advantage of unique boost and cut points and the disadvantage that if all three tone controls are adjusted to minimum, no output signal will result.

The BRIGHT switch located on the TREBLE control (pull for "on") provides a very noticeable increase in the extreme treble when the VOLUME control is advanced past position 5.

Tremolo SPEED and DEPTH controls are used to adjust the rate and effect of the tremolo circuitry. The tremolo SPEED control adjusts the rate at which the tremolo circuits vary the intensity of the amplified signal. The SPEED control will only function when the tremolo foot switch has been depressed and the DEPTH control advanced to a nominal operating position (5). The tremolo DEPTH control adjusts the amount of effect the tremolo circuitry has on the amplified sound.

The REVERB control adjusts the amount of artificial reverberation mixed with the input signal. As the control is advanced in the clockwise direction, more of the reverberation effect results. When the control is adjusted to minimum, the reverb spring will not crash or rumble when the amplifier is moved or shaken.

CHANNEL II – NORMAL

Channel II allows modified tone control action (for a bass guitar) and also allows proper equalization for a standard electric guitar.

The electric guitar has a frequency range of from approximately 74Hz (open low E) to 1320Hz (12th fret high E). The dominant harmonic overtones occur in the 128-5280Hz frequency range.

The relationship between the fundamental frequency and these harmonics determine the tonal quality of the amplified sound. The tone control circuitry provides the musician with the means to control the relationships between these frequencies.

The tone control circuits for the electric guitar are configured very much like those used on the older tube-type amplifier. This arrangement has the advantage of unique boost and cut points and the disadvantage that if all controls are adjusted to minimum, no output signal results.

Channel II tone control circuits, like those used in Channel I, can only control the frequencies within their operating range. However, control action for an electric guitar will be more apparent under most operating conditions than for the electric bass, because of the ability of the guitar to play chords.

The strumming of an electric guitar produces an extremely complex signal which, in most instances, has a fundamental frequency and at least one harmonic overtone in each of the tone control operating ranges.

OPERATING CONTROLS

CHANNEL I — LEAD

- Drive** Used in conjunction with the VOLUME control to produce a form of distortion usually associated with tube-type amplifiers. With the DRIVE control adjusted to minimum, a very clean sound results. In normal operation, the DRIVE and VOLUME controls are adjusted to achieve the desired distortion at any volume level.
- Volume** Adjusts the loudness of the amplifier. Depending on the instrument used, maximum amplifier output can be obtained at almost any control setting. Control numbers are provided for ease in readjusting the amplifier for a specified output level.
- Bass** Adjusts the level of the "low end" or bass frequencies. This control is of the "boost and cut"-type.
- Middle** This "boost and cut"-type control adjusts the level of the frequencies in relation to the bass and middle frequencies. TREBLE is also the "boost and cut"-type control.
- Treble** Used to adjust high frequencies in relation to bass and middle frequencies. A "boost and cut"-type control.
- Bright** Located on the TREBLE control, the BRIGHT switch provides an additional degree of "bite" or boost to the treble frequencies. Pull for "on"

- Speed** Adjusts the rate at which the tremolo circuits vary the intensity of the amplified signal. This control will only function when the tremolo foot switch has been depressed and the DEPTH control advanced to a nominal operating position (approximately 5).
- Depth** Controls the amount of effect the tremolo circuitry has on the amplified sound. Tremolo circuitry varies the amplitude or strength of a signal as compared to a vibrato circuit which actually alters the physical pitch of a note.
- Reverb** Controls the amount of artificial reverberation mixed with the input signal. When the control is at the minimum setting, the reverb spring will not "crash" when the amplifier is moved or shaken.

CHANNEL II — NORMAL

- Volume** Same as Channel I VOLUME control.
- Bass** Operates the same as Channel I BASS, except that the boost and cut points are modified to resemble those of older tube-type amplifiers.
- Middle** This "boost and cut"-type control affects frequencies in the middle of the electric guitar range. Control action resembles that of a tube-type amplifier.
- Treble** A "boost and cut"-type control, its action also resembles that of a tube-type amplifier and functions the same as Channel I TREBLE control.
- Bright** Operates the same as Channel I BRIGHT control.

GENERAL CONTROLS

Master Volume Controls the level from both preamplifier sections and allows the input amplifier to be completely over-driven to produce high-level distortion. This dual-unit control is located before and after the GRAPHIC EQUALIZER circuit (refer to the functional block diagram), allowing the musician to maintain the same amount of preamplifier overload distortion (if desired) at any loudness level. This control may be adjusted for optimum signal-to-noise ratio when used in studio applications. To obtain the optimum signal-to-noise ratio, adjust the preamplifier VOLUME and MASTER VOLUME controls simultaneously.

Graphic Equalizer The Kustom IV Lead guitar amplifier features a 7-band (frequency) graphic equalizer providing $\pm 12\text{dB}$ of boost or cut at each frequency and allowing the musician increased flexibility of tone control in a variety of playing environments. Before experimenting with equalizer setting combinations, begin with all slides in the "flat" or center position.

TECHNICAL SPECIFICATIONS

Power Output	276 Watts RMS @ 1.0% THD
Preamplifier gain measured at 1.0KHz. Tone controls maximum.	Channel I 30dB Channel II 39dB
Signal-to-noise ratio.	Channel I Gain min. -77dB Gain max. -58dB Channel II Gain min. -81dB Gain max. -50dB
Minimum input voltage required for rated output. Tone controls adjusted for 12 o'clock position. Bright switch in. Drive minimum. Volume adjusted maximum.	Channel I 150mv RMS
Minimum input voltage required for rated output. Tone controls adjusted for flat response at 1.0KHz. Volume adjusted maximum.	Channel II 22mv RMS
Power output measured into two 3.0 ohm loads at 1.0KHz. All tone controls maximum with bright switch in.	
Frequency response measured with tone controls adjusted for flat response.	$\pm 4.0\text{dB}$ 90Hz — 13KHz

Nominal input impedance.

Channel I 50.0K ohms

Channel II 220K ohms

Line output at rated power.

0.700V RMS, $Z_L = 600$ ohms

Absolute minimum speaker load impedance.

3.0 ohms per pair of jacks

8.0 ohms per jack

AC accessory receptacle maximum load.

200 watts

TONE CONTROL RANGE

CHANNEL I

Bass

± 8.0 dB @ 40.0Hz

Middle

± 6.0 dB @ 300Hz

Treble

± 7.0 dB @ 5KHz

CHANNEL II

Bass

± 7.0 dB @ 40.0Hz

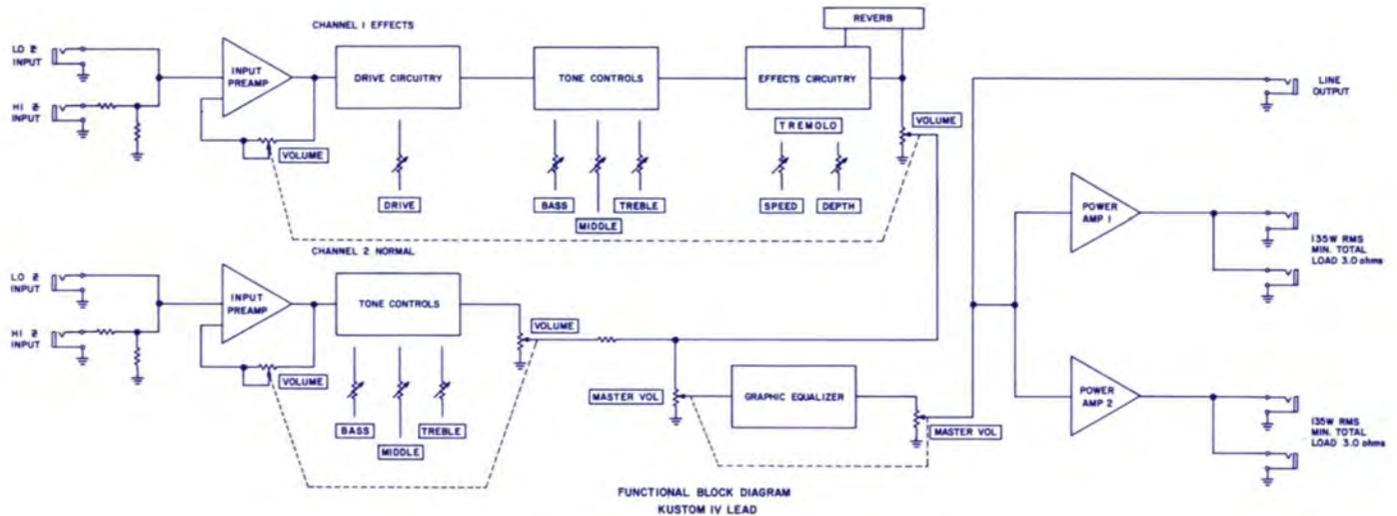
Treble

± 9.0 dB @ 15.0KHz

Middle

± 6.0 dB @ 350.0Hz

FUNCTIONAL BLOCK DIAGRAM





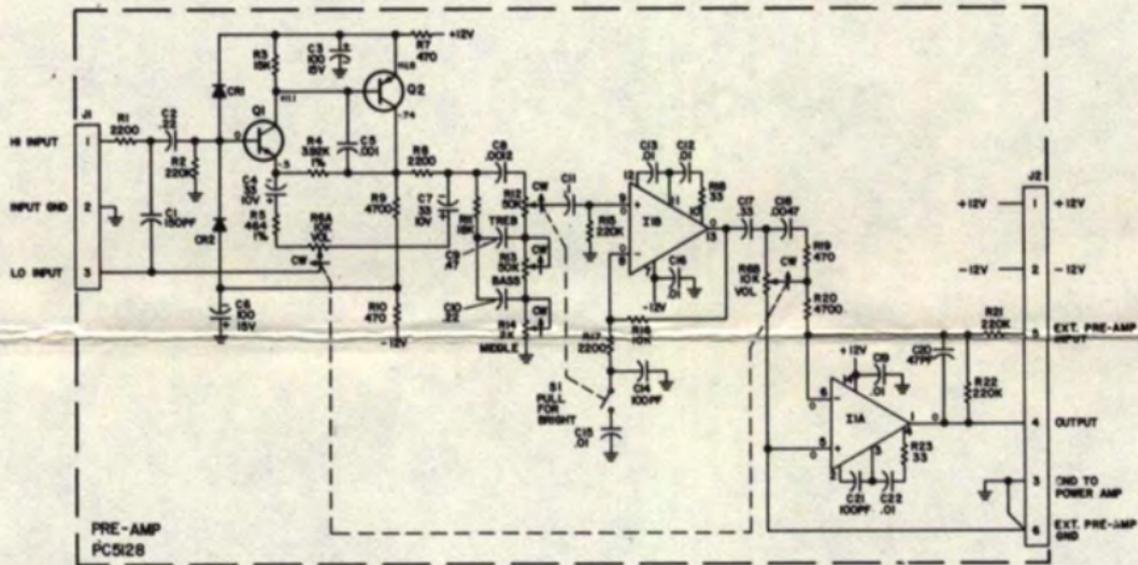
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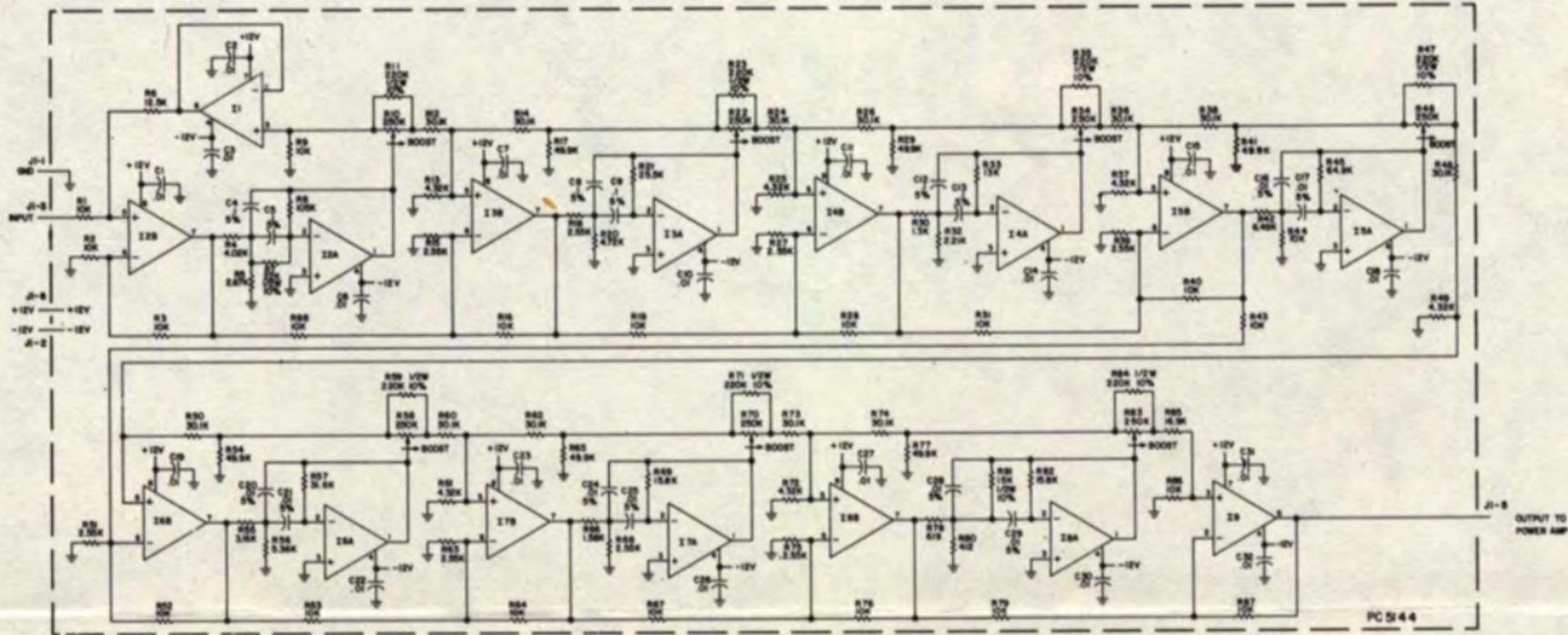
NOTES:

1. ALL RESISTORS ARE 1/2W, 10%, UNLESS NOTED.
2. ALL CAPACITOR VALUES ARE IN MICROFARADS, UNLESS NOTED.
3. VOLTAGE MEASUREMENTS ARE WITH POWER ON, NO SIGNAL, NO LOAD, AND MEASURED FROM COMMON GROUND.

HIGHEST REF NOS	REF NOS NOT USED	SYMBOL	KUSTOM PART NO.
C22		CR1, CR2	007-808-00
		Q1	007-0008-00
I1		Q2	007-0009-00
J2		J1	030-2034-00
Q2		J2	030-2035-00
RES		R6	133-0053-00
		R12, R51	133-0035-00
		R13	133-0034-00
		R14	53-0039-00
		I1	007-7015-00

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DATE		REV		ELECTRONICS, INC.	
DRAWN		CHECKED		CHANNETT, KANSAS 64780	
DATE		DATE		QUANTITY	
NONE		NONE		NONE	
PART		NAME		SHEET	
NONE		PRE-AMP PC 512B		1	
REV		REV		REV	
NONE		NONE		002-512B-00	



NOTES:

- 1. ALL RESISTORS ARE 1/4W, 1% PRECISION, UNLESS NOTED.
- 2. ALL CAPACITOR VALUES ARE IN MICROFARADS, UNLESS NOTED.

SYMBOL

- I1, I2 007-7042-00
- I3 THRU I5 007-7023-00
- R1, R22, R24 94A, 94B, 94C, 94D
- I6, I7 007-7042-00
- I8 THRU I10 007-7023-00
- R11, R12, R14 94A, 94B, 94C, 94D

HIGHEST REF NOS

- R88
- C10
- I9

REF NOS NOT USED

- I4

REV		DATE	BY	CHKD	DESCRIPTION
1		8-17			SCHEMATIC DIAGRAM
2					EQUALIZER PC 5144
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ELECTRONICS, INC.
CAGWAT, KANSAS 64785

PC 5144

REV 1

DATE 8-17

BY

CHKD

DESCRIPTION

SCHEMATIC DIAGRAM

EQUALIZER PC 5144

002-5144-00

