

BINAURA 三维声场还原系统 BA2000

BA2000 是美国 BINAURA 公司采用最新的专利技术仅用 2 只音箱实现 360 度全方位的三维空间声场。

BINAURA 技术是根据对人类听觉系统的生理及心理研究的最新成果，采用仿生学原理开发出的一种全新的三维声场定位还原技术，将普通的立体声音源和单声道音源恢复成环绕人体 360 度的声场，真实的再现了声场中每一个乐器的准确位置，使人有身临其境的强烈感觉。

BINAURA 不同于其他 3D 效果系统，他利用了最新的计算机技术，对声音信号进行精确的计算和处理，恢复出声源中丢失的空间信息，对声音进行 360 度的恢复，这种处理方式精确、真实，几乎不会带来任何噪音。

BINAURA 对低音、中音、高音都进行了最佳的计算和恢复不需要 SUPER BASE 对低音简单提升，用户应关掉 SUPER BASE，否则会影响效果。

BINAURA 能很好的和 VCD、CD、电视、LD、及多媒体电脑搭配，都能表现出完美逼真的三维环绕声场效果。营造家庭影院真实效果。

特色：

- 最新的计算机处理技术；
- 360 度环绕效果；
- 环境音表现最好；
- 外围电路少，可靠性高，无噪音；
- 能将单声道恢复三维空间效果；
- 无需 SUPER BASS。



BINAURA CORPORATION

BA2000
BINAURA®
AUDIO ENHANCEMENT
CIRCUIT

Features

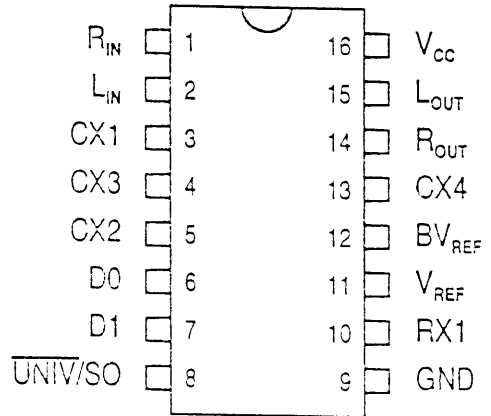
- Supply Voltage from 5V to 18V
- Bipolar Technology for Low Noise
- Digital or Manual Control of Enhancement Depth
- Automatic Enhancement of Either Monaural or Stereo Signals
- Small 16-pin Package

Applications

- Home Theater Systems
- PC Multimedia
- Car Audio
- Personal Stereo Systems
- TV Receivers
- VCRs

Description

The BA2000 Binaura® Audio Enhancement Circuit provides a compact implementation of the Binaura Universal Mode enhancement process for both stereophonic and monophonic sources. In addition it provides three levels of enhancement depth under digital control or continuous control of enhancement depth with an external potentiometer. It is designed to operate with either a dual supplies or a single supply voltage; an internal reference voltage source generates a reference at half of the supply voltage. The chip is fabricated with a bipolar process which yields low noise while allowing a high supply voltage range (5V to 18V).



Pin Connection Diagram
Dual-In-Line Package or Small-Outline Package

18元/100片

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BA2000 Data Sheet (Preliminary)

This document contains preliminary information on a new product. It is subject to change without notice

Absolute Maximum Ratings

V _{CC} Supply Voltage	20V
Input Voltage	-0.3V to V _{CC} +0.3V
Current Into Any Pin	± 50mA
Power Dissipation	500mW
Storage Temperature Range	-55°C to 125°C

Recommended Operating Conditions

Parameter	Conditions	Min	Typ	Max	Units
V _{CC} Supply Voltage		4.75		13	V
Operating Temperature Range		0		70	°C
Output Load	L _{OUT} , R _{OUT}	2K	10K		Ω

Electrical Characteristics (at TA = 25°C and 5V ≤ V_{CC} ≤ 13V unless otherwise noted)

Parameter	Conditions	Min	Typ	Max	Units
Input Impedance		35K	50K	65K	Ω
Output Voltage Range		0.5		V _{CC} -1	V
Output Impedance				10	Ω
Load, 1V _{RMS} Output		2K			Ω
V _{REF} Input Impedance			5K		Ω
Logic High Input Voltage		2.0			V
Logic Low Input Voltage				0.8	V
Logic High Input Current	V _{IN} =12V			800	μA
Logic Low Input Current	V _{IN} =0V	-10		+10	μA
Power Supply Current	V _{CC} =12V		14	TYP	mA

All Specifications are subject to change without notice. This part has not been fully characterized.



Description of Pin Functions

Name	Pin	Function
L _{IN}	2	Left channel input. Has a 50K nominal input impedance
R _{IN}	1	Right channel input. Has a 50K nominal input impedance
L _{OUT}	15	Left channel output. Designed to drive loads of 2K or greater impedance
R _{OUT}	14	Right channel output. Designed to drive loads of 2K or greater impedance
V _{REF}	11	V _{REF} signal reference input. Should filtered to ground with a single supply or connected to ground for dual supplies
BV _{REF}	12	Buffered V _{REF} output
DO, D1	6,7	Depth level control inputs. Two-bit code selects bypass or one of three depth levels (see table below)
UNIV/SO	8	Universal/Stereo-Only Mode select input. Selects Universal Mode when logic low
CX1	3	External Capacitor 1. Nominally should have a capacitor of 10nF (0.01μF) connected to ground
CX2	5	External Capacitor 2. Nominally should have a capacitor of 27nF (0.027μF) connected to ground
CX3	4	External Capacitor 3. Nominally should have a capacitor of 10nF (0.01μF) connected to ground
CX4	13	External Capacitor 4. Nominally should have a capacitor of 27nF (0.027μF) connected to ground and should be connected to RX1 through a 22K resistor
RX1	10	Nominally should be connected to CX4 pin through a 22K resistor
V _{CC}	16	Positive supply
GND	8	Supply ground for single supply or negative supply for dual supply

Mode Selection Function Table

UNIV/SO	D1	D0	Function	Relative Depth Gain
X	0	0	Bypass	
0	0	1	Depth Level 1, Universal Mode	9.5dB
0	1	0	Depth Level 2, Universal Mode	12.5dB
0	1	1	Depth Level 3, Universal Mode	15.5dB
1	0	1	Depth Level 1, Stereo-Only Mode	9.5dB
1	1	0	Depth Level 2, Stereo-Only Mode	12.5dB
1	1	1	Depth Level 3, Stereo-Only Mode	15.5dB

Application Notes

A typical application circuit is shown in Figure 1. The circuit allows control of the depth levels through TTL level control inputs. If continuous manual control of the depth level is desired the circuit in Figure 2 can be used. When an external potentiometer is used it is recommended that the depth level control pins D0 and D1 be either in one of two states: both off (bypass) or both on (Depth Level 3).

External Components

External capacitors C1 through C4 should have a ±10% tolerance or better. Capacitors based on X7R or C0G (NPO) dielectrics are preferred over high-K dielectrics such as Z5U and Y5V. The latter types should be avoided since they have high temperature coefficients, wide tolerances (±20%), and significant voltage coefficients which cause harmonic and intermodulation distortion at higher signal levels. The resistor R1 should have a ±5% tolerance or better. The



recommended values for C1 through C4 and R1 are listed in the Description of Pin Functions above. Since the DC signal levels will be biased at the V_{REF} level, many applications will require AC coupling capacitors on the input and/or the output. The input capacitors should be chosen based on the desired roll-off frequency in conjunction with the nominal input impedance of $50K\Omega$ ($0.47\mu F$ is the recommended minimum value for these input capacitors). Output capacitors should be chosen in a similar fashion depending on the loading on the output.

Power Supplies

The BA2000 is designed to operate with a single 5V to 18V supply or dual $\pm 2.5V$ to $\pm 9V$ supplies. Proper bypassing of these supplies is important to ensure low noise and proper function of the chip. The input signal DC reference level is established by the V_{REF} input pin (nominally $V_{CC}/2 - 0.3V$). This pin can be tied to ground for dual supply operation. When operating with a single supply, the V_{REF} pin should be bypassed to ground with a $10-100\mu F$ capacitor. The BV_{REF} output provides a limited drive buffered output of this reference for related circuits such as the depth adjustment potentiometer.

Input and Output Signal Levels

In typical operation, it will be necessary to provide some input signal headroom to avoid clipping on the output; that is, the input signal should be restricted to amplitudes less than the possible Output Voltage Range. While bypass mode ($D0 = L$ and $D1 = L$) passes the signal with no net gain, the enhancement modes can provide considerable gain that is dependent on the signal input. In practice, it is undesirable to provide enough headroom to ensure no clipping on a worst-case signal since 1) the worst-case condition is rarely realized in most real-world audio source material, and 2) allowing maximum headroom would severely decrease the signal to noise performance of the entire system. The desired headroom for any system is a compromise dependent on the maximum enhancement depth level used, the source material, as well as other performance factors. The Relative Gain column of the Mode Selection Function Table gives an indication of the gain on the bass component of the difference of the input channels (L-R) dependent on the depth level. This is *not* an indicator of the overall gain during the enhancement process; in practice it is much less since the difference signal component in most cases represents much less than half of the total signal power (especially music recording mixed for LP records). When playing sources that have been mixed for compact disc or other media, the proportion of difference signal can be higher, requiring more headroom.

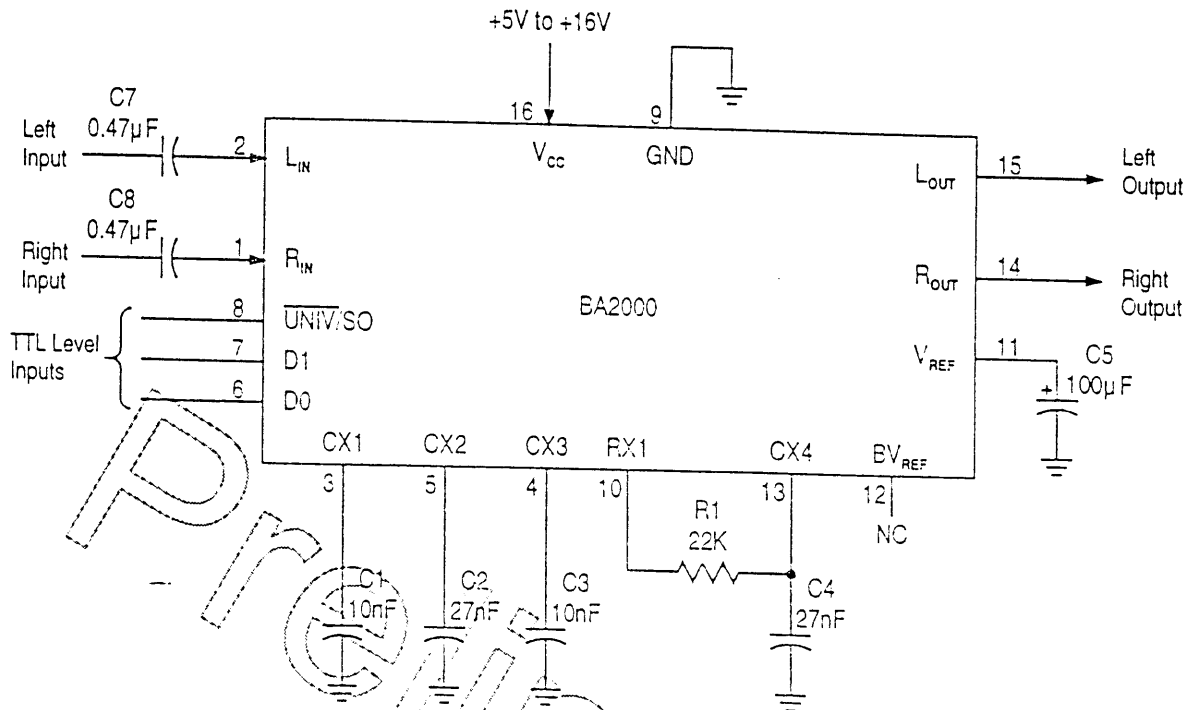


Figure 1. Sample Application Circuit with Digital Control of Depth Level

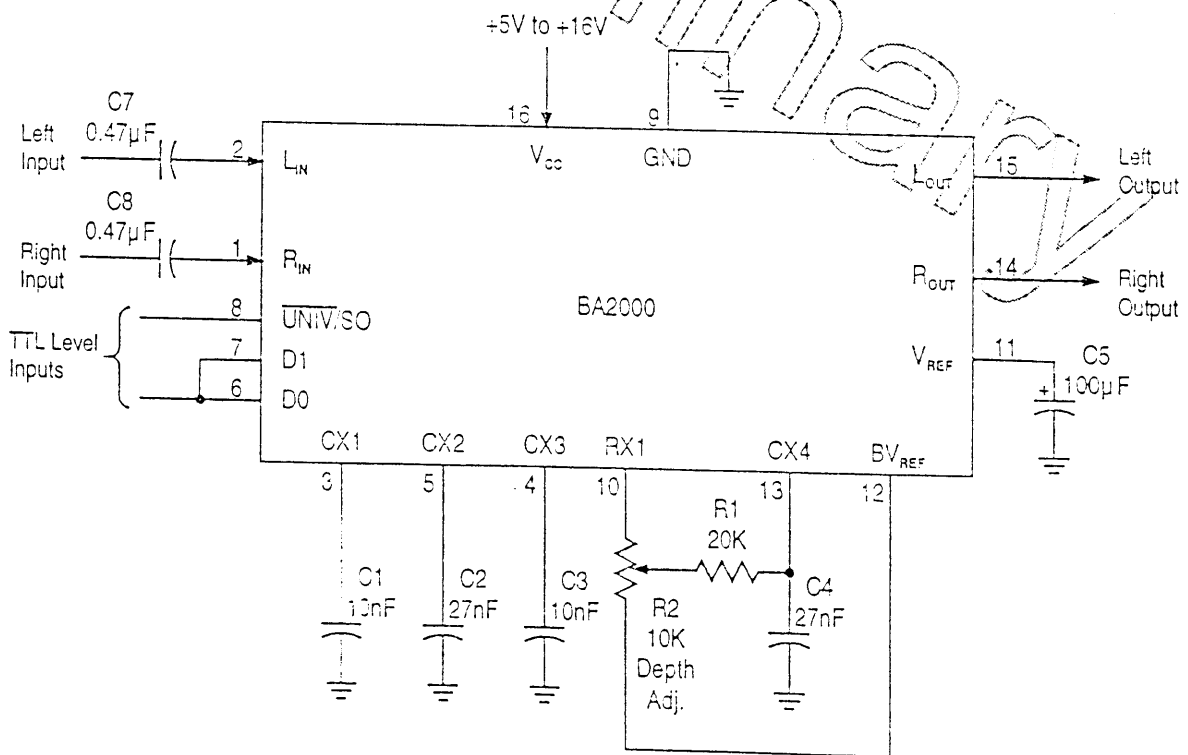


Figure 2. Sample Application Circuit with Manual Control of Depth Level

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CREATIVE LABS INCORPORATES BINAURA AUDIO
ENHANCEMENT TECHNOLOGY TO CREATE 3D STEREO
ENHANCEMENT IN SOUND BLASTER PRODUCTS

Binaura Signs Licensing Agreement with Creative Technology Ltd.

MENLO PARK, CALIFORNIA, April 9, 1996 — Binaura Corporation, a leading provider of audio enhancement technology, today announced that its audio enhancement technology was used to provide 3D stereo enhancement capabilities in Creative Labs Inc.'s Sound Blaster 16 Value PnP, Sound Blaster CD 4x Multimedia Upgrade Kit, Sound Blaster 32 PnP Wave-Table Synthesis Sound Card, Sound Blaster AWE32 PnP Wave-Table Synthesis Sound Card, and CS200 Speakers. Binaura and Creative Technology Ltd. have signed an agreement in which the Binaura audio enhancement technology may be incorporated into future multimedia and sound products developed by Creative Labs.

Binaura's 3D audio enhancement technology dramatically restores the spatial (e.g. ambient sounds or lateral reflections) content of recorded material and increases the breadth and depth of the sound image. Therefore, Binaura's 3D audio enhancement technology broadens the "sweet spot" for optimal listening. Binaura's audio enhancement technology dynamically enhances both monophonic and stereophonic signals.

(more)

Binaura Creates 3D Sound In Creative Labs Products

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"It is a priority of Creative Labs to create the most innovative multimedia and sound products for personal computers," said Rich Sorkin, vice president, Creative Labs, Inc. "Binaura's audio enhancement technology allows us to cost effectively achieve this goal," he added.

"The licensing agreement with Creative Technology Ltd. validates Binaura's position as the leading provider of audio enhancement technology in the multimedia marketplace," said Jim Uyeda, Jr., president, Binaura Corporation. "We look forward to working with Creative Labs to produce products that redefine the personal computer entertainment experience."

Binaura Corporation was founded in 1994 to develop and deliver audio technologies that redefine the listening experience by dramatically enhancing any stereophonic or monophonic sound source. Binaura Corporation's sound enhancement technologies enable manufacturers in the consumer electronics, personal computer, professional sound, video game, home entertainment and automotive sound industries to cost-effectively differentiate their products in the international marketplace. Binaura has licensed its sound enhancement technologies to more than 70% of the multimedia upgrade kit marketplace with companies such as Creative Labs. Binaura Corporation, with headquarters in Menlo Park, California, is privately held and funded.

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