

## Introduction

The OPTiSound™ 82C933 is a single chip Plug-and-Play ISA audio processor that provides uncompromising integrated 3-D audio that maintains compatibility with the currently installed base of legacy applications. By meeting PC 97 and WHQL specifications, providing Sound Blaster™ Pro compatibility, and offering Direct Sound™ support, the OPTiSound 82C933 delivers the highest assurance of overall system and OS compatibility. The OPTiSound 82C933 is an ideal ISA audio solution for desktop, mobile, and embedded applications requiring a high level of integration, and exceptional sound quality.

ECTIVA's integrated third generation 16-bit Sigma-Delta codec provides high quality analog-to-digital and digital-to-analog conversions. The Sigma-Delta codec is further integrated with a low distortion complex mixer featuring 3-D audio expansion. The OPTiSound 82C933 produces a spatial or widened stereo image from ordinary left and right channel inputs, without any initial encoding of input signals.

In addition to the 22 voice OPTiFM™ synthesis, the 82C933 architecture also provides upgradeability through audio software enhancements, including wavetable and 3D expansion—ideally suited for multimedia audio and gaming applications.

The OPTiSound 82C933 is an ideal building block for advanced audio solutions. The MPU-401 port supports external MIDI devices, such as hardware wavetable and keyboard interfaces. One asynchronous I/O port supports Zoom Video, hardware wavetable, speaker phone, modem interface, Digital CD-In, and DSP data.

The high level of integration of the OPTiSound family eliminates the requirement for additional memory, codecs, 3D, and most discrete components; which minimizes the design effort as well as the total cost of implementation. The 82C933 is offered in two pinouts optimized for system board (MB Mode) or ISA add-in card (AD Mode) applications.

The combination of solid Sound Blaster Pro compatibility with integrated 3D makes the OPTiSound 82C933 the ideal solution for desktop, mobile, and embedded applications requiring a highly integrated cost-effective audio solution.

## Applications

- Desktop Multimedia Audio
- Mobile and Embedded Audio
- Stand-alone & Internet Gaming
- Music Composition & Synthesis

## Features

- Integrated sound controller compatible with:
  - Sound Blaster Pro™
  - Ad Lib™
  - Microsoft® Windows™ Sound System™
- Microsoft PC-97 compliant
- Built-in high-quality 22 voice, 52 operator, OPTiFM™ music synthesizer with enhanced bass
- Built-in 7-channel mixer: five stereo, two mono
- Built-in 16-bit sigma-delta stereo codec
- ISA Plug and Play Specification 1.0a compatible, supports a maximum of six logical devices:
  - Sound Blaster Pro, Windows Sound System, FM synthesis
  - MPU-401 MIDI interface
  - CD-ROM interface
  - Joystick/game port
  - Modem interface
  - 82C933 control
- Supports external serial EEPROM (optional)
- External modem chipset interface
- Full duplex operation: record and playback simultaneously using two 8- or 16-bit DMA channels
- Supports IMA ADPCM,  $\mu$ -law, A-law decompression
- 8- or 16-bit stereo sound data up to 48KHz stereo
- Supports 16-bit Type F DMA playback, accelerates telephony-audio applications
- Digital joystick interface support, improves responsiveness
- I<sup>2</sup>S serial interface supports Zoom Video Port, wavetable controller and modem chipset
- Direct Sound™ interface support
- Power-down modes
- Silence mode to turn-off all audio functions
- Hardware and software volume control via push-button interface
- 100-pin PQFP (Plastic Quad Flat Pack)
- 100-pin TQFP (Thin Quad Flat Pack)



### Signal Description

Signal Name	Pin	Signal Description
<b>3D Signals</b>		
CAP3D1A	5	3D Depth Filter/Node 1A
CAP3D1B	6	3D Depth Filter/Node 1B
CAP3D2A	2	3D Depth Filter/Node 2A
CAP3D2B	84	3D Depth Filter/Node 2B
<b>ISA Bus Signals</b>		
IOW#	49	I/O Write Command
IOR#	50	I/O Read Command
AEN	51	DMA Address Enable
RESET	57	System Reset Input
SA[15:0]	13:16, 83:72	System Address Bus Lines 15 through 0
SD[7:0]	71:68, 65:62	System Data Bus Lines 7 through 0
DACK0#	46	8-Bit DMA Acknowledge Bits 0, 1, and 3
DACK1#	47	
DACK3#	48	
DRQ0	59	8-Bit DMA Request Bits 0, 1, and 3
DRQ1	60	
DRQ3	61	
GPIO0	43	General Purpose I/O Bit 0
EXTROM#		External EEPROM Enable Input
IRQ5	54	Interrupt Request Bits 5, 7, and 9 through 11: IRQ7 and IRQ9-11 are bidirectional for WSS auto interrupt determination.
IRQ7	55	
IRQ9	56	
IRQ10	53	
IRQ11	52	
IRQ15	42	Interrupt Request Bit 15
GPIO3		General Purpose I/O Bit 3
<b>MIDI Interface</b>		
RXD	9	Receive Data from 32KBaud MIDI UART Port
TXD	10	Transmit Data to 32KBaud MIDI UART Port
<b>External PnP EEPROM and IDE CD-ROM Interface</b>		
ROMCS	12	External Serial EEPROM Chip Select
PNPEN		PNP Mode Enable Jumper Bit
GPIO1	11	General Purpose I/O Bit 1
MODE0		933 Mode Configuration Bit 0
CA2	35	IDE CA2
ROMCLK		External Serial EEPROM Clock
IDEDIS#		IDE Disable
CA1		IDE CA1
ROMDOUT	36	External Serial EEPROM Data Out
CA0		IDE CA0
ROMDIN	37	External Serial EEPROM Data In
IDECS1#		IDE CD-ROM Chip Select Bit 1
IDECS3#	39	IDE CD-ROM Chip Select Bit 3
IDEIRQ	41	IDE CD-ROM Interrupt
GPIO2		General Purpose I/O Bit 2
RESET#	34	Buffered Reset (active low)
CDOE#	44	CD Output Enable
CDHOE#	45	CD High Output Enable

### Signal Description (cont.)

Signal Name	Pin	Signal Description
XIOR#	32	IDE Buffered IOR#
XIOW#	33	IDE Buffered IOW#
<b>Game Port and Serial Audio Interface</b>		
GD7	31	Game Port 2 Data Line 7
MODEMCS#		Modem Chip Select
MODEM#		Modem Interface Enable Input
VOLUP		Volume Up
GD6	30	Game Port 2 Data Line 6
MODEMINT		Modem Interrupt
VOLDWN		Volume Down
GD5	29	Game Port 1 Data Line 5
VOLUP		Volume Up
GD4	28	Game Port 1 Data Line 4
VOLDWN		Volume Down
GD3	26	Game Port 2 Data Line 3
IRQ4		Interrupt Request Bit 4
GD2	25	Game Port 2 Data Line 2
IRQ3		Interrupt Request Bit 2
GD1	24	Game Port 1 Data Line 1
GD0	23	Game Port 1 Data Line 0
<b>Codec/Mixer Interface</b>		
MICL	97	Microphone Input Left
MICR	98	Microphone Input Right
LINEL	96	Line Input Left
LINER	99	Line Input Right
CDL	95	CD Input Left
CDR	100	CD Input Right
AUXL	94	Auxiliary Input Left
AUXR	1	Auxiliary Input Right
OUTL	92	Output Left
OUTR	93	Output Right
MIXOUTL	91	Mixer Output Left
MIXOUTR	89	Mixer Output Right
CINL	90	ADC Filter Pin Left
CINR	88	ADC Filter Pin Right
VREF	86	Voltage Reference
OSCI	7	Oscillator Input: 14.318MHz
OSCO	8	Oscillator Output
<b>Serial Audio Interface Signals</b>		
SADI	19	Serial Audio Data Input
SADO	20	Serial Audio Data Output
SCLK	21	Serial Audio Clock
FSYNC	22	Serial Audio Synchronization
<b>Power and Ground</b>		
VCC	18, 58, 67	Power Connection
GND	17, 27, 40, 66	Ground Connection
AVCC	3, 87	Analog Power Connection
AGND	4, 85	Analog Ground Connection



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