



*Best Multi-channel 3D Sound Solution for PC Entertainment*

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# **CMI-102 USB 2CH Audio Controller Technical Brief**

**Version 1.0**

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## **CMI-102 USB 2CH Audio Controller**

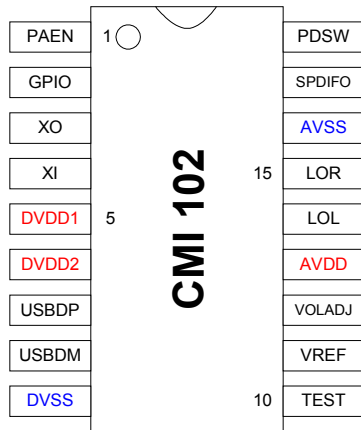
### **Description and Overview**

CMI-102 is a highly integrated single chip solution for the USB speaker application. Minimum external components are needed for building an USB speaker system with CMI-102, which makes it a simple and very cost-effective solution. Designed for speaker and PC system integration purposes, this plug-and-play solution utilizes USB bus power, not only saving additional adopter BOM cost but solving speaker noise/feedback as well. Furthermore, users will not worry about the wire problem and voltage problem in different regions any more. To provide with the enhanced energy saving function, CMI-102 includes two modes for power reduction: "**Power saving**" mode is automatically activated when no data is playback from the host, and "**USB suspend**" mode is enabled by the host's request. CMI-102 contains power amplifier enable pin and volume control VR input pin, with which very similar front panel design to conventional multimedia speaker can be built. Additional value-added S/PDIF output feature constitutes a digital link between computer and consumer appliances. More flexible and customized design is possible with GPIO pin, which is accessible by USB vendors' specific request. Better yet, users can avail themselves of a much better virtual 5.1CH environment capable only be Xear 3D™ Sound Technology. Via 3D audio conversion of this technology, personalized and optimum 5.1CH listening environment and experience is achieved.

### **Features**

- ✓ USB spec v1.1 full speed operation and USB audio device class spec v1.0
- ✓ USB bus powered 500mA operation with suspend mode support
- ✓ Single 12MHz crystal input with on-chip PLL and embedded USB transceiver
- ✓ Auto power saving mode for zero bandwidth setting
- ✓ High performance 48KHz sampling rate for audio playback
- ✓ Embedded high performance 16 bit audio DAC
- ✓ Embedded class AB power amplifier for speaker driving
- ✓ Power amplifier enable/disable control pin
- ✓ Anti-popping function for power saving mode switching
- ✓ Volume control input with simple external VR circuit
- ✓ Embedded temperature protection circuit and power on reset block
- ✓ Single 5V external power supply with internal power regulation
- ✓ 3.3V IO with 5V tolerance; 3.3V core logics design
- ✓ 18 pin PDIP or SOP lead free package
- ✓ Compatible with Win 98SE/Win ME/Win 2000/Win XP, and Mac OS 9/OS X without additional driver

## Pin Description



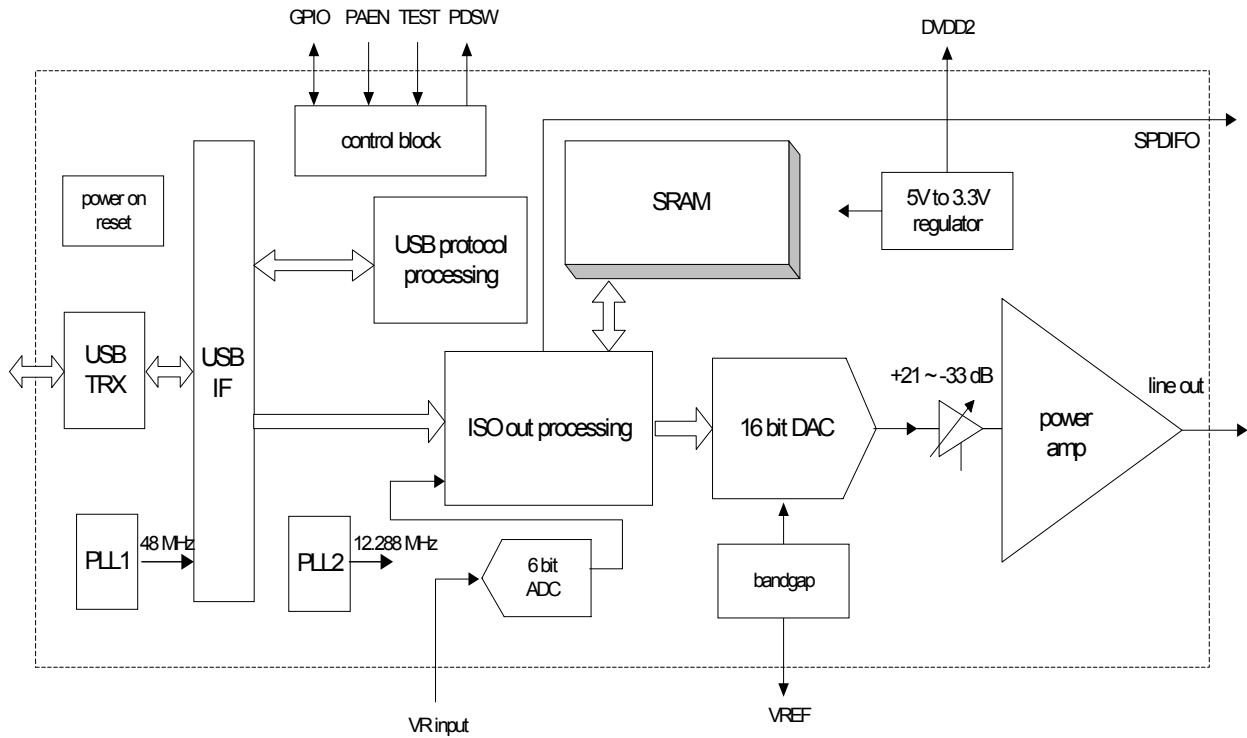
Note: The same pin ordering is used for both PDIP or SOP package

Symbol	Type	Pin #	Description
PAEN	DI, PD	1	Power amplifier enable: H – normal mode, L – power down power amplifier
GPIO	DIO, PD, 8mA	2	GPIO pin, default is input mode after reset; accessible by USB vendors' specific request
XO	AO	3	Clock output pin for 12MHz oscillator
XI	AI	4	Clock input pin for 12MHz oscillator
DVDD1	P	5	5V digital power
DVDD2	P	6	3.3V voltage from internal regulator for decouple capacitor connection It is not affected by power down mode and can be used to connect USB pull up resistor.
USBDP	AIO	7	USB data D+
USBDM	AIO	8	USB data D-
DVSS	P	9	5V digital ground
TEST	DI, PD	10	Test mode select pin; pull low in normal mode operation
VREF	AO	11	Connect to external decouple capacitor for embedded bandgap
VOLADJ	AI	12	0 ~ 3.3V input for volume adjustment by external VR
AVDD	P	13	5V analog power
LOL	AO	14	Line out left channel
LOR	AO	15	Line out right channel
AVSS	P	16	5V analog ground
SPDIFO	DO, 8mA	17	S/PDIF data output
PDSW	DO, 8mA	18	Power down switch control: 1: normal mode, 0: power down mode

### Note:

DI – digital input pin, DO – digital output pin, DIO – digital bi-directional pin, P – power pin, PD – pull down with 100K Ohm resistor, AI – analog input, AO – analog output

**Block Diagram**



**USB Vendor Specific Request for GPIO Access**

**GPIO write**

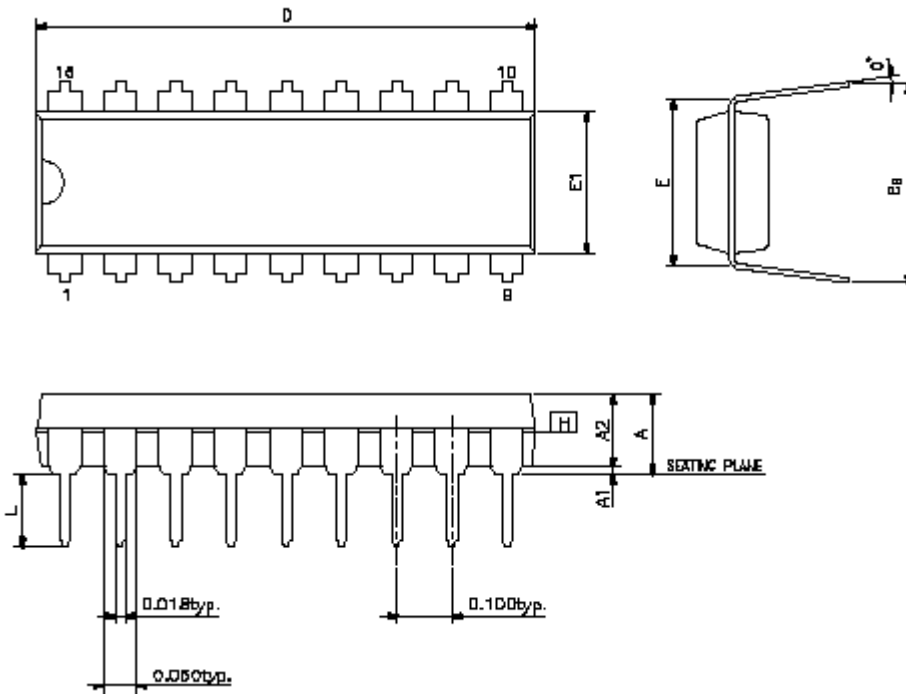
Offset	Field	Size	Value	Description
0	bmRequestType	1	43	
1	bRequest	1	01	
2	wValue	2	Value	Bit 0: GPIO value Bit 1: 1: output; 0: input
4	wIndex	2	0000	
6	wLength	2	0000	

**GPIO read**

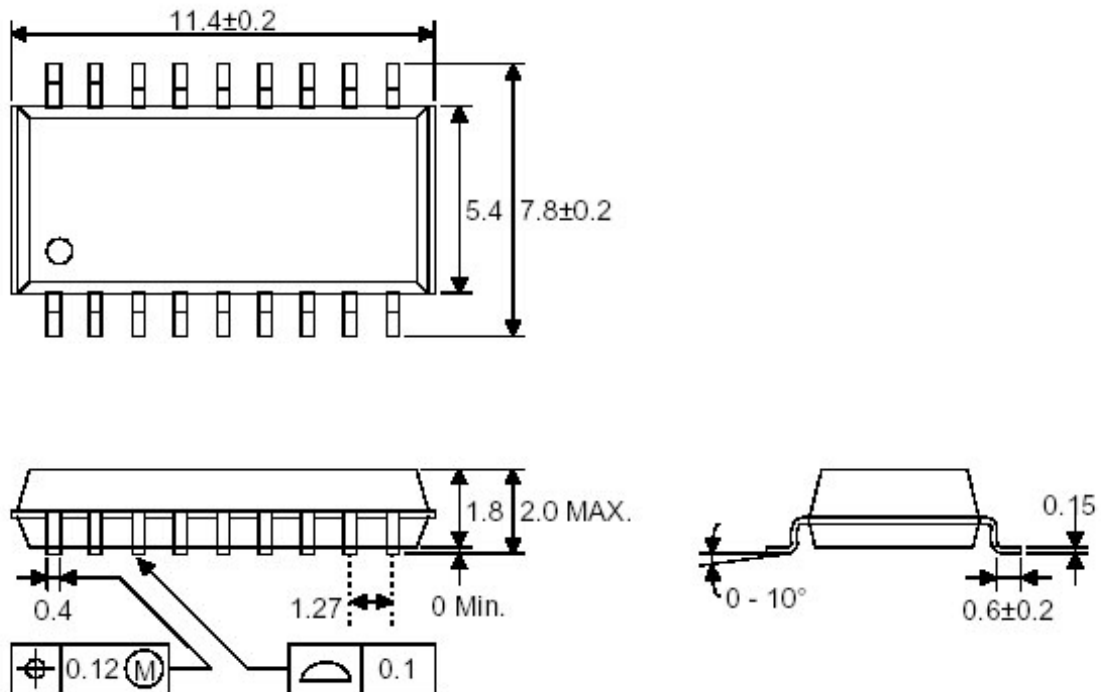
Offset	Field	Size	Value	Description
0	bmRequestType	1	C3	
1	bRequest	1	81	
2	wValue	2	Value	Bit 0: GPIO value Bit 1: 1: output; 0: input
4	wIndex	2	0000	
6	wLength	2	0001	

**Ordering Information**

**PDIP**



**SOP**



***C-Media reserves the right to modify specifications without further notice.***