

## Bose Cinemate (Original) Repair

### 1 Overview

Find out why Bose speakers don't work. User reports possible lightning surge caused damage to device.

### 2 Work Log

No visible damage inside. Power rails are all clean. Transformer outputs 22V AC. There is a switcher and a linear LDO Vreg both inside a can on the main board powering the ADSP (analog devices, in Woburn here) chip. The clock is OK. CLKIN and XTAL both have 33.33MHz clocks. No visible CLKOUT found. The board is reading external flash at boot, possibly, due to the appearance of such a chip. Checking pins of BMS and BSEL per ADSP data sheet... BMS is high, and BSEL is low, which means in data sheet... When BSEL is low, BMS and BSEL determine input. This appears to mean that BMS is an output, and its reading from external memory. There is a JTAG on the bottom of the board. I don't have the appropriate reader. There is a necessary delay after powering off the board, you have to wait for the caps to discharge, before powering back on. I found this by watching the Output enable pin of the flash on the scope (which seems to be working and apparently the flash is being read at bootup by the ADSP CPU). If you unplug power, and don't wait for the power to drop (about 5-10 seconds) it will not fully restart. The online docs say to wait one minute, hehe. That's why.



Figure 1: Main Board. CPU / ADC is under shield.

Pin DQ0 on the flash is constantly changing, in a set pattern. Perhaps flash is being accessed regularly? G (bus read) is normally high, but low during

periods at boot. Based on data sheet, G is high and W down, when writes occur, separately G is down when reads occur. Write is pin 11. Write is normally high, and goes down briefly during boot up sequence (much less than the G pin). Based on all this, I suspect the flash is operating OK, without checking jtag.



Figure 2: Main CPU board under can. Starting from 12 o'clock going clockwise, Linear and Switching power regulator, Flash, RAM, ADSP CPU (SHARC), ADC (under blue).

Checked the Remote control by viewing it via a digital camera. It is working.

Checking the user manual. No information of any real substance. Checking the service manual. I found a similar model (not exactly the same). Let's see. Can't find the exact service model for this model. Service manual not available. Facing the connector for the IR remote box, the ramps up, female side, the last two pins are audio in. The green LED is the third on the top row. IDC connector, looking at bottom, 2nd on top row is green led. Two series caps at the power, connector, breakout board (with two DB-9 connectors), is the audio coupling between the RCA connectors of the IR remote box, and the rest of the board. Looking at .1 ribbon cable, nub on the bottom, the 3rd from last column (top) is one audio connector, other is

2nd column from last, bottom. On the controller board, beneath the metal case, the two audio signals are fed into resistor dividers, one for each signal. From there they go (see picture) . From there the audio signal goes into that mysterious package, that has no label on it. Probably some ADC. EDIT: I can barely make out it is a Cirrus Logic chip. CS422BA CS4228A One of the pins on the ADC is going up and down. Connected to pin 4 of DSP (not adc). That's serial clk (pin 5 adc). Very slow. Pin 4 of DSP is: RCLK0 RCLK is the serial receive clock. The master clock is an input, PIN 10. It looks like the clock is not there. Data sheet says it must be between 4kHz to 24kHz, about. And the clock signal on Pin 10, is absent. It's like 2 Hz, or something slow. I'm going to trace where the master clock for the ADC comes from. It comes from around 25 or so on the DSP. I marked the DSP. I counted about 26, give or take one. Let's count again. I counted 25 this time. It looks like it goes to ground...? It's the one before ground. I realized I could just count down from continuity from ground. So it's PWM\_Event1. Let's boot up the device and see if it ever activates this PWM. It may be that the ADC is fine, and something else is broken. It looks like the ADC communicates with its CLOCK and the DSP during boot up, but goes into a sleep mode. I think it's something else.

Something with the infrared diode... I should also check that the infrared diode receiver recognizes the controller button presses. I tested the remote, and the receiver. I can see output on the remote, but do not see any on the diode receiver. I'm going to do some research on what the waveform should be.

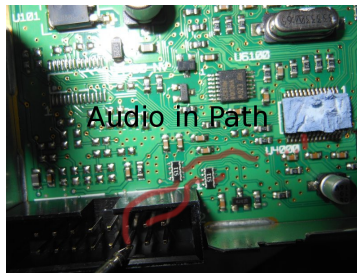


Figure 3: Audio In Path

Looks like there is no waveform. I will buy a new receiver diode, and if that doesn't fix it, I give up.

## 2.1 Work Log 10/18

Diode fixed it. 38KHz model from Radio Shack. Pinout was identical. There is a youtube video online that covers this repair also.

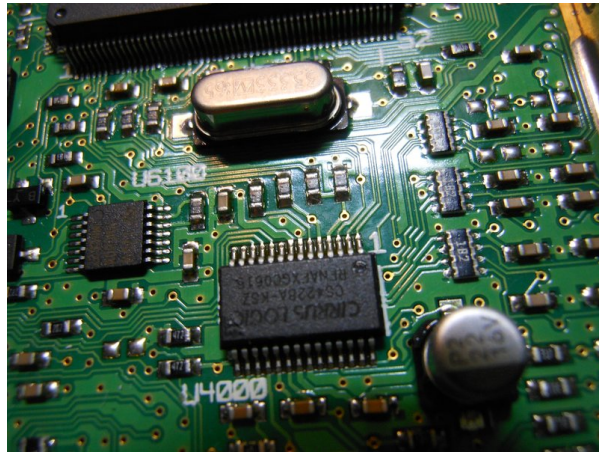


Figure 4: ADC with logo visible: CS4228A



Figure 5: IR is normally invisible, however my digital camera picks it up. A Quick way to test IR is to take a picture. Alternatively, you can probe the diode leads with an oscilloscope.

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<sup>1</sup>An exception would be IR that is borderline visible spectrum as in some CCTV cameras. These give away the cameras position, but serve as a healthy reminder not to stare at the IR leds when you see the dim red light.