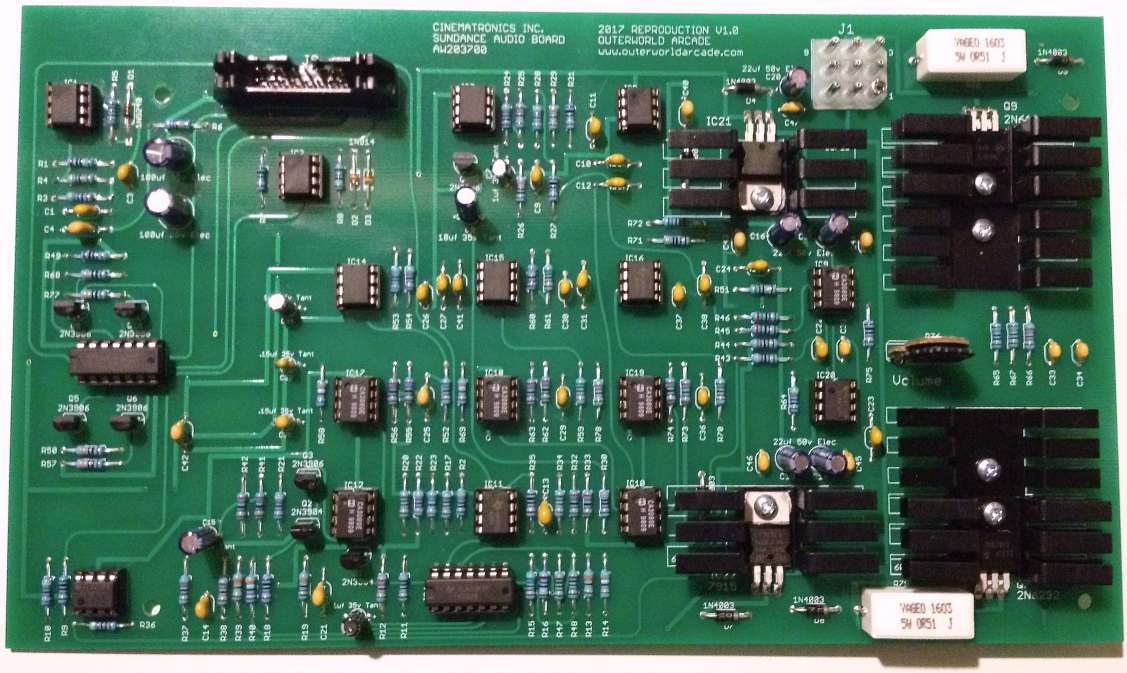


Cinematronics Sundance Reproduction Audio PCB v1.0



Pricing

Sundance Audio PCB: \$275.00

Optional Audio Harness Converter: \$15.00

USA Shipping (Priority Mail with Insurance): \$13.50

Overview

The Sundance Reproduction Audio PCB is a drop-in replacement for the original Sundance Audio PCB with most traces and components in the same locations as in the original board. The reproduction has the following upgrades over the original PCBs:

1. Upgraded Resistors. All resistors are 1% tolerance (metal) rather than the 5% tolerance (carbon) used in the original boards, providing greater accuracy in the sound circuits.
2. Socketed ICs. Sockets have been installed for all ICs for easier maintenance and troubleshooting.
3. Added circuit protection for Amplifier. An additional .51 Ohm 5% 5W resistor and 1N4003 diode were added to each half of the Power Amp circuit in the audio boards of later games such as Armor Attack. This protection has been also added to the reproduction Sundance Audio board.

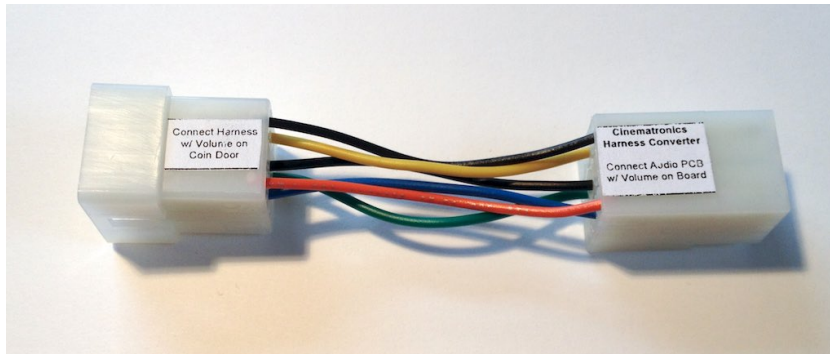
4. Upgraded Voltage Regulation Circuits. The original Sundance voltage regulation circuits used tantalum capacitors, which were prone to failure. This circuit was upgraded by Cinematronics beginning with the Rip Off audio board, replacing each of the 3.3uf tantalum capacitors with 22uf electrolytic capacitors and a .1uf ceramic disc capacitor. The circuit was further refined in boards such as Star Castle and Armor Attack, adding four 1N4003 diodes to the circuit. The Sundance Reproduction Audio PCB v1.0 uses this final revision of the circuit.

5. Component Labels. The reproduction board includes component values that were not labeled on the original boards.

6. Upgraded Capacitors. The original Sundance boards used a number of tantalum capacitors in the sound circuits. By 1980, Cinematronics had phased out the use of tantalum capacitors in its audio boards replacing them with film or electrolytic capacitors.

In the reproduction board, tantalum capacitors 1uf and above are replaced with electrolytic capacitors. In my initial experiments replacing capacitors between .1uf and 1uf with film capacitors, I found subtle changes in the sounds produced. For now, I am continuing to use tantalum parts for these two .15uf capacitors.

Ceramic disc capacitors are replaced in most locations with multi-layer ceramic capacitors (MLCC), which have much smaller tolerances than standard disc capacitors. I am currently installing ceramic disc capacitors at locations C25, C29 and C36 for subtle adjustments to the pings and bong sounds.



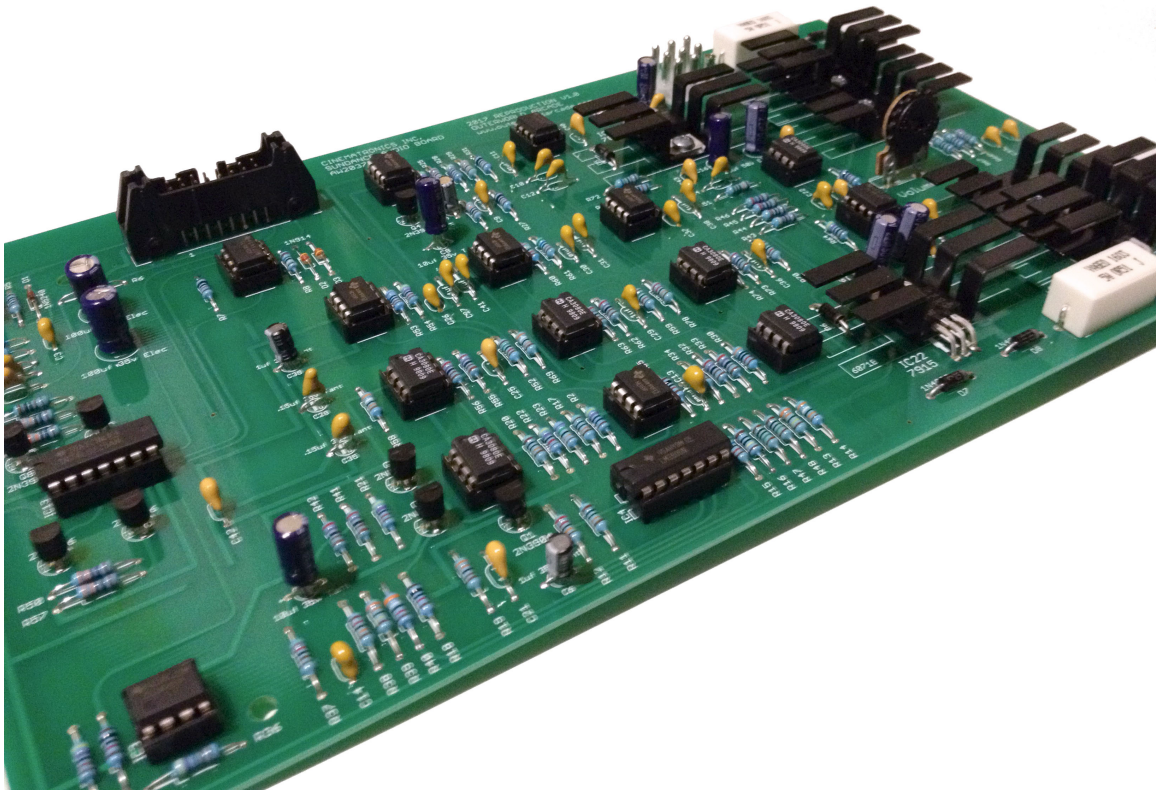
7. Audio Harness Converter. With the optional harness converter, audio PCBs with volume control on-board (such as Space Wars, Starhawk, Warrior, Sundance) can be plugged into cabinets with the volume control located in the door (Rip Off, Star Castle, Armor Attack). When installed, the volume is controlled by the potentiometer on the Sound PCB and the coin door volume control has no effect.

Installation Overview

The Reproduction Sundance Audio PCB is a drop-in replacement for the original Sundance Audio PCB. To install, just power off the machine and swap in the reproduction board. If installing into a cabinet with the volume control located on the coin door, install the harness converter between the board (J1) and the game's wiring harness. This connector is keyed and should only connect in the proper orientation. The ribbon cable to the Cinematronics CPU (J2) is not keyed and it is possible to insert it backwards.

Ordering Information

Due to the time it takes to hand-assemble a board, the Reproduction Sundance Audio PCB is available in small quantities and limited availability. Pricing is subject to change. Please email arcade@outerworldmedia.com to find out about current pricing, availability and to purchase a board.



Revision History

1.0: March 2017 Initial Release

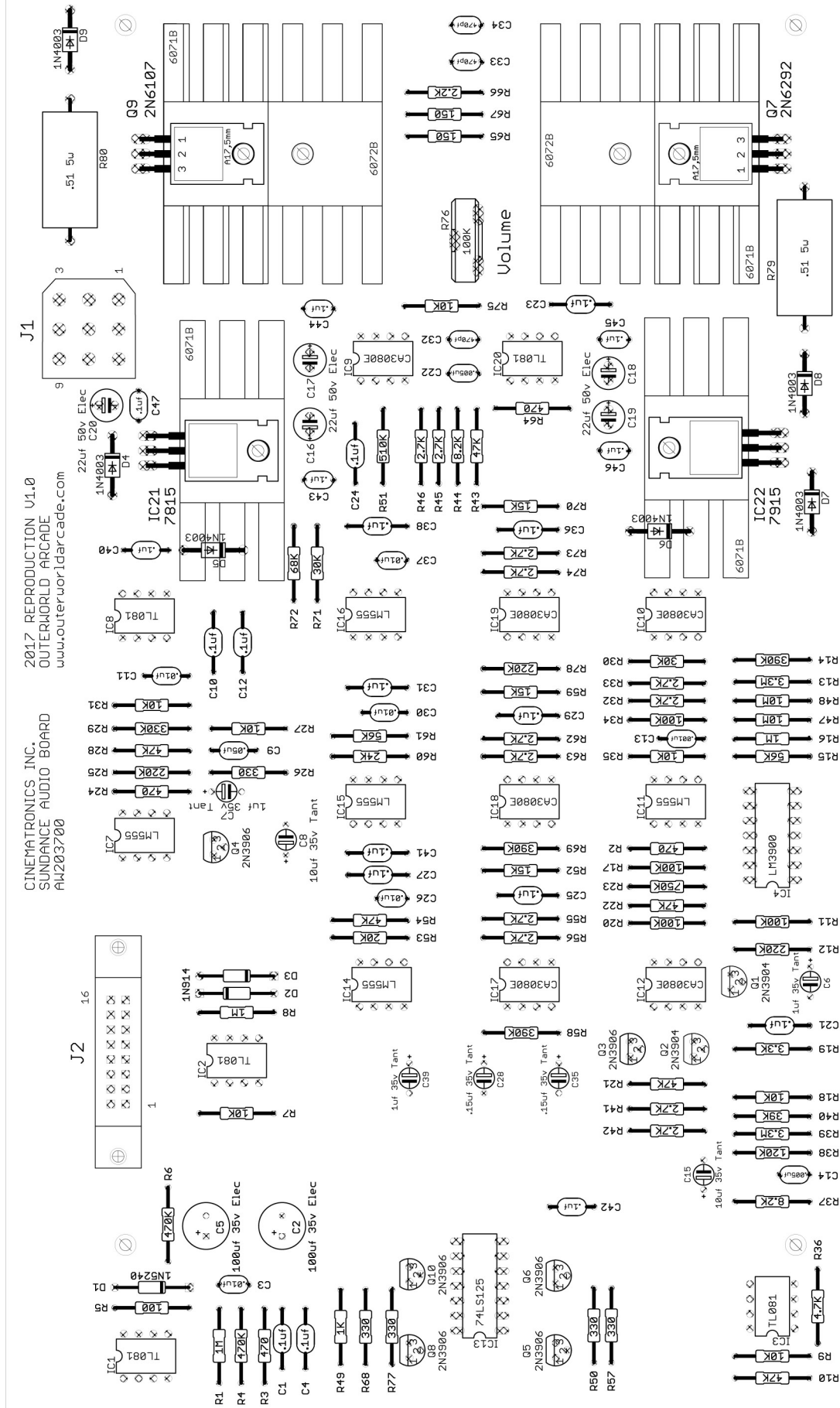
Known Issues:

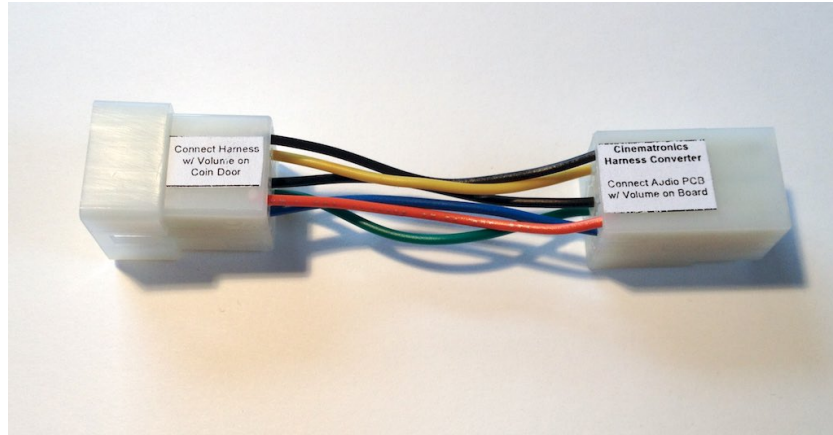
The mounting holes are very slightly misaligned, but all four mounting screws can be attached. The horizontal distance between the holes is .5mm too narrow. The vertical distance between the holes is .5mm too wide.

I am installing electrolytic capacitors instead of the original tantalum in some locations. These locations are labeled tantalum on the board as originally specified. In future revisions capacitor labels will be changed to list possible capacitor types (Electrolytic, Tantalum, or Film).

CINEMATRONICS INC.
SUNDANCE AUDIO BOARD
RA1203700

2017 REPRODUCTION V1.0
OUTERWORLD ARCADE
www.outerworldarcade.com





Building an Audio Harness Converter

The Audio Harness Converter allows the use of audio PCBs with volume control on-board in cabinets with the volume control located in the door. When installed, the volume is controlled by the potentiometer on the Sound PCB and the coin door volume control has no effect. Without this converter, -25v on pin 8 is connected through the volume control in the coin door to the game's speaker.

Below is the pinout for the Audio Harness Converter if you have the tools and wish to build one yourself. The converter changes shaded rows.

Parts:

Plug	Molex 03-09-2092	Quantity: 1
Receptacle	Molex 03-09-1093	Quantity: 1
Male Terminal	Molex 02-09-1119	Quantity: 7
Female Terminal	Molex 02-09-2118	Quantity: 6
22 AWG Stranded Wire		

To Harness Volume off-board (coin door)				To Audio PCB Volume on-board		
Pin #	Pin Gender	Connection	Wire Color	Pin #	Pin Gender	Connection
1	-	Volume GND	N/C	1	Male	
2	Male	Speaker	Green	2	Female	Speaker
3	-	Volume		3	-	
4	Male	+25v	Yellow	4	Female	+25v
5	Male	Speaker GND	Black	5	Female	Speaker GND
6	Male	-25v	Blue	6	Female	-25v
7	Male	GND	Black	7	Female	GND
8	-	Volume		8	-	-25v
9	Male	+5v	Orange	9	Female	+5v