Multi Channel Speaker Array and Amplifier

Overview
Dr. Thompson is looking to show a proof of concept to the GN Group of a low cost, small-scale, fully immersive audio system that controls an array of forty-eight individual speaker channels. GN sees this project as a system that could be fine-tuned to be applied to many different uses, such as a museum exhibit aiming to simulate the movement of water.

Objectives
We were tasked with creating an amplifier array capable of amplifying 48 independent audio signals. This array needs to be fully compatible with Team 2’s speaker arrays.

Approach
- Amplifier Selection
  - Research options based on price, size, and performance.
  - Utilize design matrix to narrow choices.
  - Test individually to make final decision.
- Create CAD model for box. Size, cost, and ventilation are all important factors.
- Water-jet and machine cut aluminum to create sturdy housing.
- Researched different power supplies to power two Printed Circuit Boards (PCB)
- PCB Design
  - Hold six amplifiers per board. This gives 12 channels of audio.
  - Input: Phoenix connectors from MOTU 24Ao go to header on board
  - Output: Header connects to female RCA cables
- Male end of RCA cable is attached to Team 2’s speaker array for easy connections.

Outcomes
- Our amplifier system successfully integrated with Team 2’s array of speakers to output sound from 48 speakers
- Our amplifier system has been designed so that our sponsor can make modifications as necessary. It is also simple to add more channels.
- This project has saved the sponsor about 250 hours of work with our design