

## Game Design Challenge Finalist Team 694

**Team Name:** StuyPulse

**Location:** New York, New York USA

**Game Name:** Rhythm Remix

### **Game Overview:**

In Rhythm Remix™, two alliances, forming bands of three teams each, compete to perform the best song. The game is played with 4" diameter foam balls called Beats. Each band has a High and Low goal at the venue corners, and a Track along the length of the field. There are 2 protected zones per band: the Booth, in front of the high goal of each team, and the Mixer, a human player and loading station, where human players deploy Beats.

Each band has 35 beats to distribute, either among their robots (up to 7 Beats per robot), the Stage (up to 10), the Mixer (up to 6), in a line parallel to the booth (up to 9), and in the Human Player Station (up to 16). During the 15 second Intro of each match, robots follow pre-programmed instructions to earn 5 points for moving off their Stage, 5 points for each Beat scored into their low goal, and 8 points for each Beat scored into the high goal on their side of the field.

In the following 2 minutes and 15 seconds, drivers remotely control robots to acquire and score Beats gathered from their Mixer or the concert floor. During this period, the high goal locations swap, meaning a missed Beat earns points for the opposing band. Robots hold up to 7 Beats at a time, and as Beats are scored, they are randomly reintroduced to the field or funneled to the Mixer. Every scored Beat is worth 1 point regularly, and 3 if scored in a Boosted goal. Each match has a randomized Tempo, 13 (slow) or 18 (fast), and every time an alliance scores this number of balls, their Boosted goal switches between High and Low.

Each band has a one-way swinging door, or "Bridge," between its Mixer and Low goal. Robots may pass under the Bridge to decrease cycle times, but may not cause more than 7 Beats to leave the Mixer between each entry. Except in the protected zones of the Booth and Mixer, robots may play defense against opponents acquiring or scoring Beats.

At a self-selected time during the match, each band deploys a set of 16 Chords, purple 4" diameter rubber balls, that can be scored by either alliance. Every Chord is worth 2 points regularly, and 6 in a Boosted goal.

In the final 30 seconds of each match, bands also earn points by "performing an Encore" by:

1. Attaching a minibot to the start of the Track from its Booth (10 points);
2. Having a minibot reach the center of its Track (10 points);
3. Having a human player retrieve a minibot (15 points).

After 2 minutes and 30 seconds, the band with the most points wins the match! Each band earns 2 ranking points for a win and 1 for a tie. Each band earns 1 additional ranking point for having scored 19 or more Chords into their goals collectively, and another for earning 60 or more points during endgame.

### **Describe Notable Field Elements:**

The field is bordered with 2' tall walls along its lengths, behind which the spectators are situated, and 8' tall walls along its widths, behind which drive teams operate.

At 2 venue corners, there are sets of 2 goals. The low goal is a quarter-cylinder 19" tall and 5' in radius, while the high goal within it is a quarter cylinder 6.5' tall with a 19" radius. Both of these goals have open



tops into which balls may be scored, and the high goal also has a 6" slit, 4" from its upper rim, for balls to enter. During the match, these goals are backlit with LEDs to indicate band ownership, and each goal has a 6" LED panel which is lit only when the goal is Boosted. Goals are equipped with a color and motion sensor to automate score counting.

Human players release balls into the field through pipes at the Mixer. Robots can exit this area from an opening at its opposite end, or through the Bridge, a one-way door that robots with the required height and/or mechanisms may pass through for a more direct path to their low goals. This Bridge is 4" above the ground at its lowest, so that Beats may pass underneath even when closed, and 3' at its highest.

Chords are stored in rotatable troughs on both lengths of the field, from which the human players can release Chords during the tele-operated period. Along the length of each field there is also a chain Track, consisting of a pole inside the field on one end and a pole outside the field on the other end, between which a link of chain is stretched taut. Human players retrieve minibots from behind the pole outside the field walls.

### **What are robots expected to do?**

During the Intro, robots score preloads and move off their Stage, acquiring as many Beats as possible. Robots capable of traversing the Bridge will likely move to acquire from the Mixer. All capable robots will aim for the High goal due to the potential bonus, and safety net of the surrounding Low goal. During tele-op, low-goal robots will disregard the Tempo, possibly using the Bridge for faster cycles, or running cycles to "sweep" Beats from the Mixer to the field. Robots may hold the Bridge open for partners. Capable robots will aim for their High goal when boosted, either from just outside their human player stations (cross-field), from the opposing stage, from their protected Booth, or from the midline. Some robots will remain in place, rotating to score in the Boosted goal. Because Beats start on the floor, Chords may only be acquired from the ground, and random field reintroduction leads Beats to the field floor, most robots will have ground intakes. Teams will aim to exclusively score Chords into Boosted low goals to avoid risk when missing. Bands may intentionally score in the opposing goal to change the opposing band's Boosted goal, debuffing Chord cycles immediately prior to scoring. Teams will attempt to coordinate positioning prior to Chord deployment when their low goal is Boosted, and before endgame, robots will cluster near Chord depots if not deployed yet. As defense, robots will block the Bridge exit, obstruct and acquire Chords deployed by the opposing band, and attempt to herd Chords into their Booths. Bands with a lead will disregard the Tempo, only running Low goal cycles, while losing bands will be inclined to take the risk of High goal shooting. During the endgame, teams will deploy minibots from a maximum of possible angles, so multiple robots can deploy simultaneously.

### **Did you use the Game Design Challenge Element in your concept?**

Yes

#### **If yes, how?**

A taut 18.5' chain, called a Track, is suspended along part of the length of the field between two poles, one inside the field, and the other outside the field. Each band has their own Track, situated on the same side of the field as their Chord depot. The adjacent Booth is the designated area for robots to deploy their minibots onto the Track during the final 30 seconds of each match. Teams earn 10 points for beginning their Encore, defined as being within 5 inches from the pole within the field and having been suspended above the ground exclusively by the chain for at least 10 seconds. Teams earn an extra 10 points for every minibot that successfully performs a partial Encore by also passing the midpoint of the Track before the match ends, suspended from and supported only by the chain. Finally, teams earn 15 additional points for every minibot that has completed the first two tasks and is also retrieved by the human player, an action that may only be done once the minibot is within 5 inches of the pole outside the field. Since Tracks are suspended along the length of the field above the area from which Chords are deployed during the tele-operated period, the same human player performs both tasks.

