Super Robo Rally

By Steve Hassenplug and Jetro
Pictures by Steve Hassenplug

The game Robo Rally was designed in 1985 by Richard Garfield, who later created the card game Magic: The Gathering. It was originally published in 1994 and a number of expansions sets were published. Many other alternative boards have been designed by fans of the game and the game was rereleased in 2005.

The mechanics of the game are quite simple, but the game results unpredictable enough to keep it interesting. At every turn the player receive a set of cards from which they choose the most appropriate ones to program their robot. The board represents a factory floor and the robots need to cross it to pass through a series of checkpoints. The objective is to be the first to complete the course, but there are numerous obstacles: conveyor belts can help you in the right direction, gears turn you around, your opponents can push you off your course and lasers can cause you damage that limits your operating capacity.

If you want to get a feel of the game I recommend you visit this demo to see a videogame version of Robo Rally: http://www.wizards.com/avalonhill/robo_demo/robodemo.asp

After the success of Monster Chess, a huge chessboard on which motorized chess pieces equipped with MINDSTORMS NXTs have it out in a game that somehow reminds you of the giant chess scene in from the Harry Potter movie, the creators of Monster Chess set out to do something new, more colorful and even bigger: Super Robo Rally.

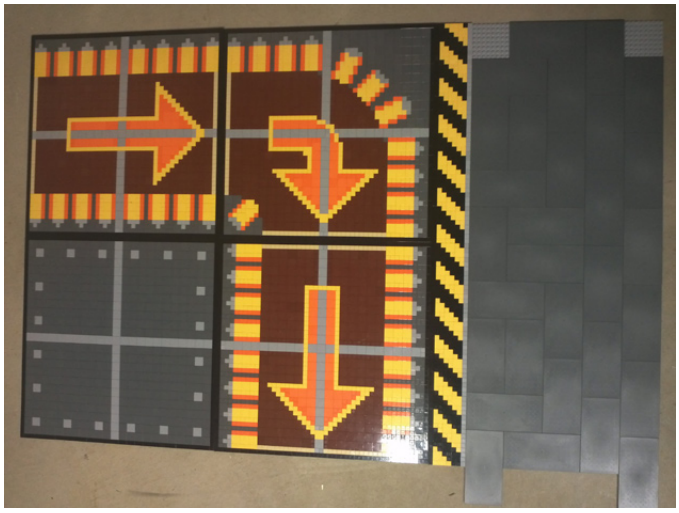
If you thought computer games were going to make board games a thing of the past, Super Robo Rally adds a new twist to games: programming robots to play a board game! I talked to Steve Hassenplug, the main man behind this creation, and this is what he told me:

Why Robo Rally

Robo Rally is a game that I've loved for many years. It's designed around programming robots to race around a factory. It's a very fun game that was almost made to be recreated in LEGO®. It's a game where people are programming real robots to drive around a very large and colorful game board.

The Board

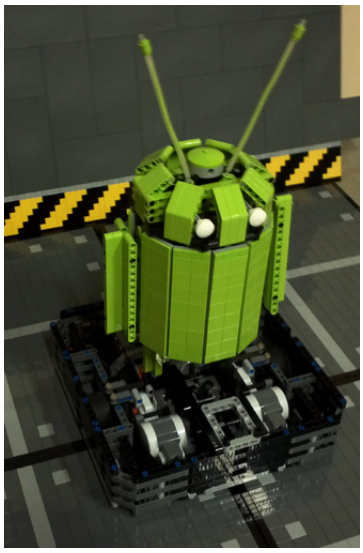
After making Monster Chess, we realized we could use the same scheme for a board for Super Robo Rally. The first "trick" is to create the border, which defines the size of the board. The border is made of 48x48 baseplates, covered in 8x16 tiles. The border pieces are all connected together, using the same 8x16 tiles. In the game, the border is defined as a pit, so we've also included an 8-stud "warning track".



Thanks to LEGO tolerances, none of the baseplates inside the border need to be connected together. Using this border system allows us to put the board baseplates in any location we want.

The actual images on the board were all hand-drawn. I wanted the images to be very crisp and clean, and most software seems to blur the edges of the lines. So, in the end pretty much everything was hand-drawn as a 48x48 pixel image.

The hardest image was the gear. Making it look round, with teeth and arrows, at a very low resolution was a real challenge. I think we went through about 15-20 different versions before creating the final version.



We're not sure exactly how many pieces we used on the board. Each image is a combination of 1x1 tiles and 2x2 tiles. I'm guessing we used about as many 1x1 as 2x2, which means about 460 of each for a single baseplate, or somewhere around 132,000 for a 12x12 board (not counting the border)

Each square on the board also has a line that the robot can use to navigate. The line is light-gray, so some of the colors are lighter, and others are darker. The robot has to do some fancy line-following to stay on the line. We're still trying to improve that.

The game has walls. The robot can not drive through a wall. In Super Robo Rally, the walls are the only board element that actually sticks up on the board.

The Robots

The robot bases are exactly the same as the ones used in Monster Chess. In fact, we need to build more bases. Right now, we have to share them between the two games. In Super Robo Rally, the robots actually use a simpler program. While the chess robots know their current location, and can calculate a path to a new location, the SRR robot software takes simple commands, like "move forward 1 square" or "turn right 90 degrees", so the robots know very little about their own location, or the location of anything around them.

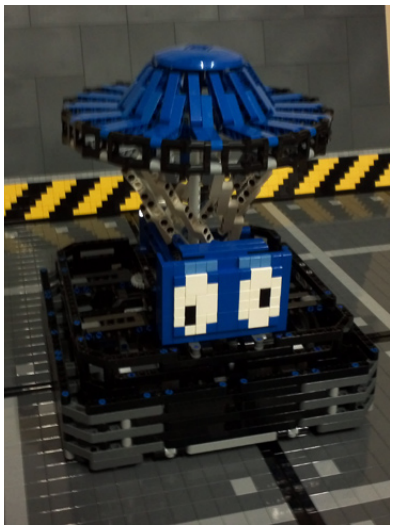
Much like the knight in Monster Chess, all the robots have some special action they can perform while they are moving. This action does NOT take place when the robot is being pushed by another robot, or when the board effects are causing the robot to move.

Currently, we have eight robots:

Name	Builder	Action	Comment
Twonky	John Brost	Arms and legs move	Most identifiable and popular robot from the actual game
Zoom Bot	Steve Hassenplug	Wheels spin	Actual game robot
Spin Bot	Bryan Bonahoom	Whole body spins	Actual game robot
Twitch	Steve Hassenplug	Tank Treads run	Actual game robot
Hulk x90	John Brost	Originally, the extra motor would cause the tank to fire a dart. In the second version, Hulk has been colored green, and the treads move when it's active	Actual game robot
R2D2	John Brost	Head lights up and turns	Famous robot
Android	Steve Hassenplug	Wiggles arms	Famous robot
Alpha Rex 1.0	LEGO®	no current action	LEGO MINDSTORMS hero model
Wall-e	???		Coming soon

My favorite is Android, but when we play, I usually let someone else have it, and I pick Twitch, because the moving tracks are cool

The pieces can NOT physically push each other. Thanks to some advanced navigation commands from the PC, a “pushed” robot will turn to face the direction it’s going to be pushed, both the pushed and pushing robots will move, and then the pushed robot will turn to face its correct direction, again.



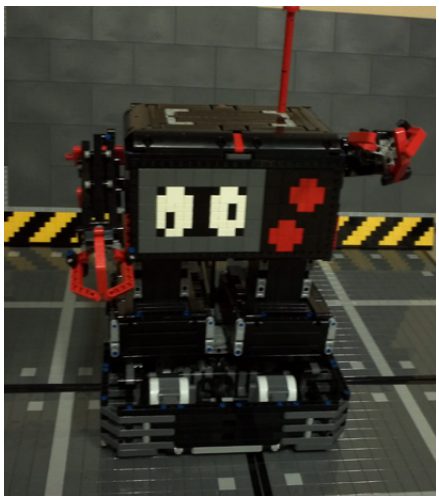
Playing the Game

The actual game is all controlled from a PC. The PC shows the board layout, robot position, and has a second screen to display game information like damage, lives, and flags touched.

John built a card dealer that randomly deals RFID cards to the players. After the players select their cards and put them in order, they are placed in a scanner, where they are read and sent to the PC. Then, the PC calculates all the movement, and creates a list of moves. When everyone is ready, the PC connects to all robots via Bluetooth, and sends the commands to move robots in the correct order.

The PC software was written in C#, and the robot software was written in NXC.

Normally, Robo Rally games will be played on two or three 12x12 boards. Super Robo Rally is played on a single 12x12 board, meaning robots are constantly bumping into each other, and pushing each other off course. In a single phase of the game, each robot would make one move (a move could be up to three squares, depending on the cards a player has) and frequently one robot will push other robots, before they push the first robot back to its original square.



When we’ve taken it to a show, games have been limited to one or two hours, so we made sure to configure the board so no one would finish (and end the game) before time expires. So the length of the game can be controlled by changing the board layout. I think we’ve played for as long as three or four hours.

Shows

Super Robo Rally debuted at Gen Con 2011, which is a large gaming convention.

Many people at Gen Con already knew what the game was, and I had someone say “They took Robo Rally, and added extra AWESOME”. There were many very positive comments. On the other hand, we also took it to Brickworld Ft Wayne, where few people knew the game. While everyone seemed to enjoy the artwork, and had fun watching the robots, we had to spend a lot more time explaining how Robo Rally is played.

In the end, it doesn’t take too long to explain, and most boys have to be drug away by their parents.

We don’t have too much scheduled, but SRR will be at Brickworld 2012 in Chicago.

Curious for more? You can see Super Robo Rally in action searching for “Super Robo Rally” on YouTube.
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