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Hackers Welcomed, Here’s Our Protocol

Posted on January 16, 2012 by phu

Ever since we created our first prototype, we’ve wanted Romo to be hackable. Inspired by Makerbot and the Seattle makers’ community, we set out to design a universally compatible, flexible, and cheap robot.

With the first generation of robots shipped in December, we have included 3 auxiliary outputs in the front of the robot that you can plug actuators into and draw 5V power from Romo’s battery. We have also provided an iOS library that you can download and use to create your own apps for Romo. But what happens when you don’t have an Apple developer license or have intimate knowledge of how to create mobile apps?

Some of our most zealous users have taken this a step further. For example, Craig helped us by posting the audio signals required online: http://romotive.com/forum/discussion/15/control-signals-decoded. Thanks, Craig! We didn’t want these findings to get lost in the forums, so we’re giving you a bump here on the blog.

Summarizing Craig’s findings:

> Left Movement - 950 hz sine wave on left stereo channel
> Right Movement- 950 hz sine wave on right stereo channel
> Forward Movement- 250 hz sine wave on left stereo channel
> Reverse Movement - 250 hz sine wave on right stereo channel
> The length of the signal determines how long the particular movement/motor is active.

To add to the above, peSHIr’s (Jarno) mentions that you can also affect the motor speed by modifying the amplitude of the sine wave. Many times, you can make Romo go slower by turning down the volume a few

What does this mean for you? For the December first generation robots, all you n o move the robot is the ability to generate or play a sine wave of 950hz and 250hz continuously.

More specifically:

- **950hz** sine wave on the **LEFT** stereo channel = Left Motor Reverse, Right Motor Forward = **Left turn** in place
- **950hz** sine wave on the **RIGHT** stereo channel = Left Motor Forward, Right Motor Reverse = **Right turn** in place
- **250hz** sine wave on the **LEFT** stereo channel = Left Motor Forward, Right Motor Forward = **Forward**
- **250hz** sine wave on the **RIGHT** stereo channel = Left Motor Reverse, Right Motor Reverse = **Reverse**

What about the auxiliary ports? Currently, the auxiliary ports are always on. With the second generation robots, we’re working to get the ability to control these ports by sending the board specific signals. We’ll post that as soon as we get that stable.

The next generation of the firmware (available in Feb) will allow the robot to have variable speeds for the robot and better control over the auxiliary ports. For our first generation owners, we’re happy to guide you through updating your firmware.

Robot power!

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2 thoughts on “Hackers Welcomed, Here’s Our Protocol”

1. Robert-Reinder Nederhoed on April 10, 2012 at 8:34 pm said:

   Could you update this post for the second edition Romo? The byte commands are far more difficult to reverse engineer.

   Thanks!

   Reply ↓

2. Pingback: Hackers Welcomed: Here’s Our Second Generation Protocol | romotive

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